

HUMAN PERFORMANCE

HUMAN PERFORMANCE FACTUAL REPORT

April 27, 2017

I. ACCIDENT DCA17IA020

Operator	Eastern Air Lines
Location	Flushing, New York
Date	October 27, 2016
Time	1942 eastern daylight time
Vehicle	Boeing 737-7L9
Registration	N278EA

II. OPERATIONAL FACTORS / HUMAN PERFORMANCE GROUP

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III. SUMMARY

On October 27, 2016, about 1942 Eastern Daylight Time (EDT), Eastern Air Lines flight 3452, a Boeing 737-800, registration N278EA overran runway 22 during landing roll. New York's La Guardia Airport (LGA). The chartered passenger flight, operated under the provisions of *Title 14 Code of Federal Regulations Part 121*, originated from Fort Dodge Regional Airport (FOD), Fort Dodge, Iowa. The 9 crew and 39 passengers evacuated the aircraft via airstairs. The flight

departed about 1623 CDT¹. Night instrument meteorological conditions prevailed at the time of the incident and an instrument flight plan had been filed.

IV. DETAILS OF THE INVESTIGATION

The Human Performance Group learned of the incident on Thursday, October 27, 2016. On Friday, October 28, the group members travelled to Flushing, NY. The group included members of Operational Factors and Human Performance from the NTSB and members from the FAA and Eastern Air Lines.

From the company, the group collected flight documentation including the flight release, weight and balance, flight crew training records, duty time and rest records, flight crew manuals, training materials and courseware related to crew resource management. From the FAA, the group reviewed the flight crews' certification records and medical history and information from the PTRS (Program Tracking and Reporting System)

On Saturday, October 29, 2016, the group conducted in person interviews in Flushing, NY with the incident captain and incident first officer.

On Monday, November 14, 2016, the group conducted an interview, via teleconference, with Eastern Air Lines former director of safety and security.

On Tuesday, November 29, 2016 and Wednesday, November 30, 2016, the group conducted in person interviews in Miami, FL with Eastern captains and first officers who had previously flown with the incident crewmembers, manager of training, vice president of operations, vice president of technical operations, chief pilot, chief inspector, and incoming director of safety and security.

On Thursday, December 1, 2016, the group conducted in person interviews in Miramar, FL with the current and former principal operations inspector (POI) assigned to Eastern Air Lines.²

V. FACTUAL INFORMATION

1.0 Flight Crew Information

1.1 The Captain

1.1.1 The Captain's 72-Hour History

The first leg of the trip began on October 14, 2016.

¹ Central Daylight Time

² Interview summaries for the incident crew, Eastern Air Lines Personnel, and FAA can be found in Attachments 1, 4, and 5 of the Operational Factors Group Chairman's Factual Report respectively.

On Monday, October 24, the captain flew from Indianapolis to Charlotte, Charlotte to Greensboro, and Greensboro to Indianapolis arriving at 0919 CDT. He went to bed about 0030 CDT and slept until 1100 CDT.

On Tuesday, October 25, he and the first officer flew commercially to Salt Lake City on Delta via Minneapolis. After arriving about 1700 MDT³ he went to dinner with his son. He watched television for about an hour and went to sleep about 2230 MDT.

On Wednesday, October 26, he slept until 0800 MDT and went to breakfast about 1000 MDT. He met his son briefly in the morning and flew from Salt Lake City to Colorado Springs, then Colorado Springs to Omaha. He was off duty at 1156 CDT and went to bed about 0130 CDT on October 27.

On Thursday, October 27, he awoke about 0830 CDT. He had no difficulties sleeping that night and stated that when he awoke he felt as rested as could be expected with “normal flying” 14 days into a trip. He took the airport shuttle to the airport about 1000 CDT. He flew to Fort Dodge before departing Fort Dodge for LaGuardia which was the incident flight.

1.1.2 The Captain’s Personal Background

The captain reported that he normally gets between 6 and 8.5 hours of sleep. He considers himself more of an evening person. He reported no history of sleep disorders nor problems remaining asleep when he goes to bed.

The captain experienced a major life change as his father passed away about 4 months before the incident. He reported that this was the only major change in his life in the past year. He takes medication for blood pressure and takes a nasal spray, similar to Flonase, for allergies. He reported having 20/20 vision, no issues with color vision, and having a corrective lenses limitation on his medical certificate. He reported drinking alcohol on occasion (last consumed at dinner on October 25) and does not smoke or use illicit drugs.

1.2 The First Officer

1.2.1 The First Officer’s 72-Hour History

The first officer’s trip began with a commercial flight from Miami, Florida to Las Vegas, Nevada on October 20, 2016.

On Monday, October 24, he had a 31- hour rest period in Indianapolis that ended at 1530 CDT. He flew from Indianapolis to Charlotte, Charlotte to Greensboro, and Greensboro to Indianapolis. He reported sleeping well that night.

³ Mountain Daylight Time

On Tuesday, October 25, he flew from Indianapolis to Salt Lake City on Delta arriving about 1641 MDT. He estimated he went to bed between 0130 and 0200 MDT time on October 26. He awoke between 0815 to 0830 MDT that morning.

On Wednesday, October 26, he had a report time of 1540 UTC and flew from Salt Lake City to Colorado Springs, and Colorado Springs to Omaha. He went to bed around 0100 CDT on October 27.

On Thursday, October 27, he estimated he awoke between 0815 to 0830 CDT, and ate breakfast. He could not recall the quality of his rest the night prior to the incident. He remained in the hotel all day. After breakfast, he went to the gym, worked out, and also did some laundry at the hotel. After that, he took a shower and then departed for the airport. He operated the flight to Fort Dodge, and Fort Dodge to LaGuardia which was the incident flight.

1.2.2 The F/O's Personal Background

The first officer usually goes to bed around 2200 to 2300 local if he does not have to wake up early. He does not consider himself a morning person and normally feels rested after he gets 7 to 8 hours of rest. He feels that the quality of sleep is “not the best” and usually wakes up 2 to 3 times per night. He reported that when he has to get up at 0400 local or when he has the 10 hours of minimum rest, he does not sleep well during the night and has trouble falling asleep. He does have to wake up early occasionally and he did have an early wake up earlier in the week of the incident. He does not take naps during the day.

When at home, he typically would wake up and go to the gym to work out; he also plays tennis. During the day he will also pick up his son from school. He normally stays in the hotel when he is on the road.

He reported no medical issues or sleep disorders. He does require reading glasses, and he was required to have them for his FAA medical certificate. He received his last medical certificate in October 2016. He reported having no color vision issues. He stated he does not take prescription medication and drinks alcohol occasionally. He recalled that he had a beer with his dinner one evening but could not remember which night. He does not use illicit drugs nor does he smoke. He had had some personal life changes, as he was getting a divorce.

1.3 Medical and Pathological Information

1.3.1 The Flight Crew's Post-Incident Toxicological Testing

Post-incident drug and alcohol testing for both pilots was negative for alcohol and major drugs of abuse⁴.

⁴ Eastern Airlines tested the pilots for drugs and alcohol about 6 hours after the incident on October 28, 2016. Test results showed both pilots tested negative for the following drugs: marijuana, cocaine, amphetamines, opiates, barbiturates, benzodiazepines, and PCP. Blood alcohol tests were also negative.

2.0 CRM Training and Guidance

The current manager of training has been in the position for about 1.5 years. He was also a check airman and had been with the company for 2 years.

Three courses were provided at the airline on CRM. These included new hire, captain's upgrade, and recurrent. Classes were taught using PowerPoint slides, open discussion and videos created by contracted training organizations. The new hire CRM course consisted of a 2-hour segment covering CRM background, communications processes and decision behavior, team building and leadership, workload management and situational awareness, individual factors and stress reduction, and error management. The upgrade training included 1 day of ground school in which 1 hour was dedicated to CRM. Upgrade training also incorporated a captain's leadership course. The leadership course included content on the captain's authority, briefings, workload management, and sterile cockpit procedures. The recurrent training included a 3.5-day ground school for captains and first officers in which 1 hour was devoted to CRM training.

The captain felt like he and the first officer were working well as a crew during the trip. The incident first officer mentioned a lack of communication on rollout as he did not hear the captain say he took the controls. The captain stated he did not call for a transfer of controls and in hindsight he should have. He further mentioned that he thought it was "OK" for both crewmembers to be applying brakes. Another Eastern first officer who had flown with the captain prior to the incident described the captain's CRM as "good."

3.0 Safety Management

Eastern's SMS implementation plan was approved by the FAA in February of 2016. At the time of the incident, the former director of safety and security stated that the first segment of the implementation was not fully realized as they were working towards an October 30, 2016 deadline. The first segment of implementation included administering the SMS implementation plan and developing a tool, Aviation Resource Management Solutions (ARMS), which was designed to help the company with safety risk assessment, assurance, and risk management.

Eastern Air Lines organizational structure included a director of safety and security (DOS) who reported to the CEO.⁵ At the time of the incident, the safety department was in transition. The former DOS had held the position since 2013 and left the company in September 2016. His replacement was hired in mid-September and was in the process of being trained by the former DOS. As the newly hired DOS was being trained, the company listed their vice president of regulatory compliance as their acting DOS. The DOS was the only person working in the safety department at the time of the incident.

⁵ The organizational chart for Eastern Air Lines management can be found in Attachment 15 of the Operational Factors Group Chairman's Factual Report.

The responsibilities of the DOS are listed in figure 1. Both the former DOS and DOS in training described additional responsibilities within the company outside of their duties within the safety office.


Director of Safety Quick Reference Guide (QRG)					
	<table border="1"> <tr> <th>Form</th> <th>Revision Date</th> </tr> <tr> <td>EAL-QRG-SAF-901</td> <td>08/01/2015</td> </tr> </table>	Form	Revision Date	EAL-QRG-SAF-901	08/01/2015
Form	Revision Date				
EAL-QRG-SAF-901	08/01/2015				
Purpose and General Instructions					
This checklist is intended to serve as an aide for directors and managers to use in the daily performance of their duties. The listed items act as controls to further ensure the duties and responsibilities are accomplished in a timely manner. The position listed at the top of this checklist is designated the checklist owner.					
Daily Tasks					
<ul style="list-style-type: none"> ➤ Check status of incident / accident reporting requirements ➤ Attend Daily Operational Review and Daily Maintenance Meeting as able ➤ Review status of on-going audits and confirm compliance with IEP ➤ Monitor status of CASS Audits and CASS Meetings for effectiveness and coordinate with CASS Manager as required ➤ Maintain constant watch for operational risks ➤ Verify any known accidents or incidents have the appropriate report filed ➤ Verify any known accident/incident or damage investigations have been initiated 					
Weekly Tasks					
<ul style="list-style-type: none"> ➤ Check status of investigations for incident/accidents as required ➤ Review Audit Reports as necessary (Self-Audits, Special, Maintenance/Service Providers, FAA) ➤ Check that Routine Monitoring and Trend Analysis has been performed by Safety Team ➤ Distribute Safety information as available (Internal, External, Contractors/Vendors) ➤ Communicate Safety Concerns about Observed events to Employees, Vendors, and Contractors ➤ Review FSIMS page for recent changes http://fsims.faa.gov/ 					
Monthly Tasks					
<ul style="list-style-type: none"> ➤ Schedule Safety Review Committee Meetings Distribute prior months minutes ➤ Publish monthly newsletter ➤ Update Quick Reference Guide ➤ Review/Schedule Monthly Executive Safety Committee Meeting Create Agenda ➤ Review scheduled Departmental Self-Audits & IEP Master Audit Schedule for coordination & compliance ➤ Review/Schedule Auditor Training ➤ Review FRMP Course Critiques to evaluate quality of training ➤ Monitor Status of DCTs on FAA Website ➤ Review possible requirements for special or external audits ➤ Ensure external evaluation programs are reviewed ➤ Ensure Audit Reports have been distributed to affected personnel 					
Quarterly Tasks					
<ul style="list-style-type: none"> ➤ Publish Quarterly Safety Newsletter TALK ➤ Review Safety Policy with CEO ➤ Review Safety Training Program ➤ Review Update ERM and HZM 					
Annual Tasks					
<ul style="list-style-type: none"> ➤ Check status of Fatigue Risk Management Awareness Training Ref: FRMP Chapter 6 ➤ Evaluate all Safety and Airline Records for compliance with 5.97 (Controls, Assurance, Training) 5.97 ➤ Schedule ERP Exercise 					
Administrative					
The owner of this checklist is responsible for recommending updates when their authority and responsibilities are revised. When change is required, complete a DCR per MPP 11.12.3 procedures for review by Manual Review Board and approval by the DOS. Checklist maintained on the Digital Library.					

Figure 1. Responsibilities of Eastern Air Lines' Director of Safety and Security

The Eastern Air Lines SMS Manual states that Eastern personnel are required to report irregularities in operations and potential hazards as they are discovered. The personnel reporting irregularities may remain anonymous and they will be informed of the outcome of reports. Eastern offered four options for report irregularities, hazards and reportable events. These include submitting a Quality Concern Report, using the Employee Hotline, submitting a Flight Operations Irregularity Report, or directly emailing the director of safety. The reporting information is also reiterated in the beginning of each of their company manuals.

Of the 4 captains and first officers interviewed at Eastern, 3 had not submitted an irregularity report personally and 3 did not believe there was a means to report anonymously. The DOS in training stated that a majority of reports received were from the specific department, having come up in conversation and were then added to the system. The former DOS described a stigma where occasionally people may believe that reporting could be used against them, however he eventually got the message across. He, nor any other company personnel that were interviewed, had heard of any cases of punitive repercussions for reporting.

4.0 Engineering Materials Arrestor System (EMAS)

The Engineering Materials Arrestor System (EMAS) uses “crushable material placed at the end of a runway to stop an aircraft that overruns the runway. The tires of the aircraft sink into the lightweight material and the aircraft is decelerated as it rolls through the material.”⁶ This technology was developed and implemented in order to improve safety at airports where the full 1000-foot runway safety area beyond a runway end could not be obtained due to conditions such as lack of available land or obstacles such as bodies of water, highways, railroads, populated areas or severe drop-off terrain. As of November 2016, the FAA reports that there have been 11 incidents in the United States where EMAS has safely stopped an overrunning aircraft.

There are four EMAS beds installed at LaGuardia Airport that are installed on the departure ends of each runway. The EMAS at the departure end of Runway 22 measured 272 feet in length by 170 feet in width and was set back approximately 30 feet from the runway end.⁷

4.1.1 Eastern Air Lines Crew Awareness of EMAS

In this incident, the aircraft veered to the right toward the end of the runway, travelled through the right forward corner of the EMAS arrestor bed at the departure end of Runway 22 and came to rest off the right side of the EMAS, 172 feet beyond the end of the runway. During a post incident interview, the first officer stated he was using rudder attempting to hold the aircraft on centerline as it approached the end of the runway. He stated he was familiar with the EMAS system. The captain stated that once he saw the end of the runway approaching, he took the controls and initiated maximum manual braking and input right rudder in an attempt to avoid the road he perceived at the end of the runway. He stated that he was looking for the most drag at the end and thought he could get better braking veering to the right and had forgotten about the EMAS. He

⁶ https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=13754

⁷ EMAS at departure ends of Runways 04, 13, and 31 have the dimensions 215x170 feet, 327x170 feet, and 215x170 feet respectively.

vaguely remembered reading about EMAS prior to the incident, however had not had any training on it.

The chief pilot at Eastern Air Lines stated that he was personally familiar with EMAS, and that the company did not cover it in training at the time of the incident. He stated that they plan to incorporate training about EMAS and the intent of the system in the future. Another captain at Eastern stated that he had personally heard about EMAS and had read about it after the incident, but had no formal training on EMAS.

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