Integrating human factors and SMS at an air carrier

International Air Safety Summit

November 13, 2018

UNITED

Challenges of Human Factors and SMS integration

Human Factors in design

- Engineering human factors considerations into our processes
- Requires staff engagement to be effective
- Safety Action Teams can help

Challenges of Human Factors and SMS integration

SMS

- Helps determine potential hazards or risk through process change and data
- Taking us from reactive to proactive / predictive in safety
- Data driven

Human Factors

- Human element of a system
- Data point that can lead to either an active or latent failure
- Difficult to obtain meaningful data / many not collecting data

How do we collect that data effectively and use it in an SMS environment to mitigate risk?

Human factors and SMS training

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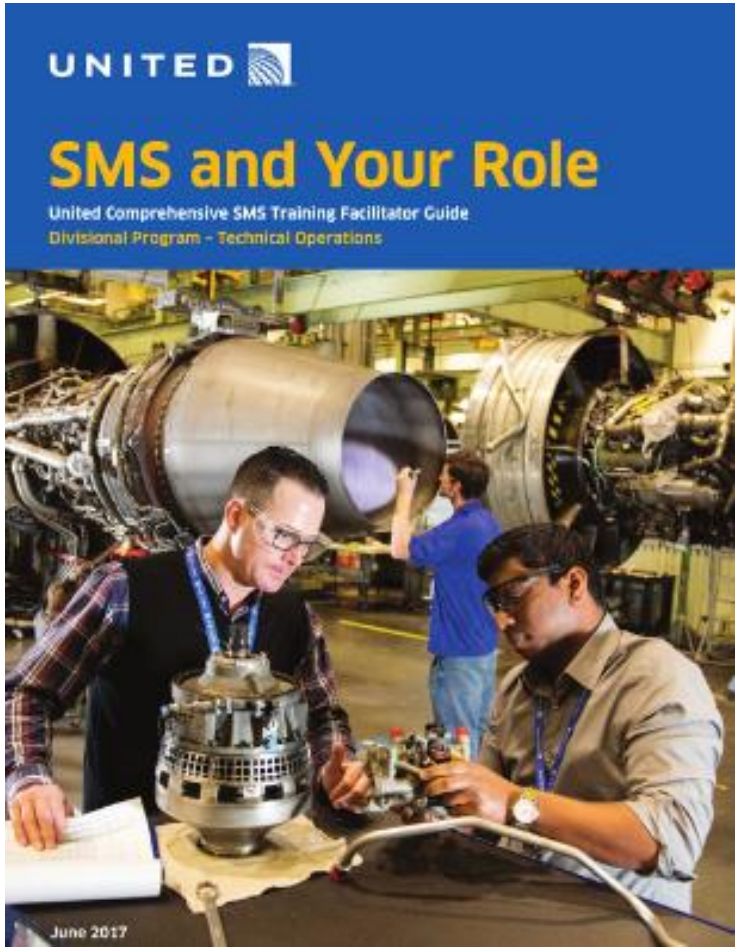
Human Factors Training

- Released in 1993 by Gordon DuPont
- Traditional human factors training hasn't changed much in 25 years
- SMS requires us to continually monitor for hazards in our system
- How are we monitoring for these human factors, and integrating them in our SMS?

SMS Training



- SMS training defined by individuals role
- Three different training packages

Human Factors Training

- Train using actual data from station or region as the focal point to mitigate the human factor risks
- Engaging technicians more in relation to human factors with tools like a human factors newsletter and snippets in the daily briefings they get at the beginning of their shifts

UNITED Technical Operations

Tech Ops Maintenance Human Factors

Volume 1, Issue 1

Welcome to the first of a new quarterly publication for Tech Ops Human Factors

Each quarter we are going to focus on one area of Human Factors and how it relates to you, the United Airlines Technician.

Complacency on the line | a barrier to our success

With the roll out of the Core4 framework of Safety, Caring, Dependable and Efficient, we have further reinforced the fact that safety remains the key component to United's continued success. Being in the aircraft maintenance business means we are in the safety business as everything we do is based on a foundation of safety and it shows.

We successfully operate a very complex operation every day, 24/7/365. The size and complexity of our maintenance operation reinforces the importance of consistently following clear established procedures.

One of the barriers to our continued success is inconsistency or complacency in the workplace when standard operating procedures are not followed. The risks or impact of complacency in the workplace can range from reducing efficiency up the worst case scenario of catastrophic failure. Even the most experienced technicians fall into the complacency trap.

We have some good tools in place to combat complacency such as our peer to peer safety observation program (LOSA), safety interventions, supervisor 360 safety audits, our TSAP program and improved root cause analysis.

Some of the challenges identified by these tools and processes are:

Failure to follow established procedures

Failure to follow AMM and task card procedures

Taking shortcuts because "we've always done it that way" or "it will never happen to me"

Lack of awareness or situational awareness

Lack of focus on the task at hand

We all have different pressures and influences in our everyday life but as I look at United's fleet and operational performance with pride I know it takes me and the whole team remaining focused and taking the time needed to ensure that the decision being made or the procedure being followed is done correctly and in accordance with the established procedures.

We all have a lot to be proud of in Tech Ops but you can take extra pride in the effort taken to do the job right every time to ensure the safety of our people, our customers and our assets.

Thank you.
Don

How do you combat complacency?

One of the best ways to combat complacency is to constantly challenge yourself. An Inspector at ORD, someone I admired for the professionalism he always showed, once told me that he accomplished every inspection with the idea that he could find something wrong, and had the attitude that he challenge himself to look at it like this was the first time he had ever done the task, instead of the hundredth time or more. How can you challenge yourself to not be complacent?

For those at ORD, a Tech Ops tool bag for the first correct guess as to who that inspector was (he's now retired). Send your answer to: **douglas.neufeldt@united.com**

Fatigue in Technical Operations

- Industry, along with A4A, FAA, and Pulsar working on a Maintainer Fatigue Specification due to release in 2019
- No Part 117 for maintainers
- Will be managed through 14 CFR, Part 5, SMS

- Joint venture with Pulsar to monitor potential fatigue in the operation
- Uses “live” time clock data to inform Management of potentially fatigued technicians to better manage the operation

Maintenance LOSA

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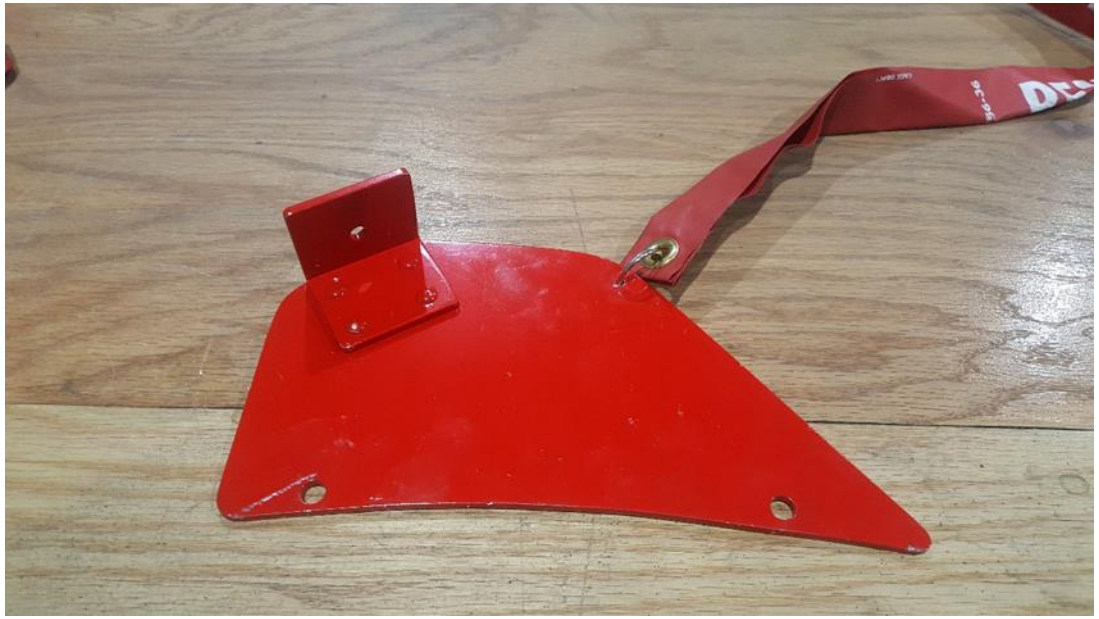
Maintenance Line Observational Safety Audit (MLOSA)

- Peer-to-peer observations during normal operations
- Confidential, and non-punitive data collection
- Voluntary participation with trusted and trained observers
- Joint management/union sponsorship

- United Airlines started in fall of 2016 at one line station, now nearly in all hubs
- Collecting actionable data
- Looking at Integrating human factors questions into MLOSA checklists

MLOSA successes

Electrical pit access tool



757 engine cowl bracket

ASAP and SMS

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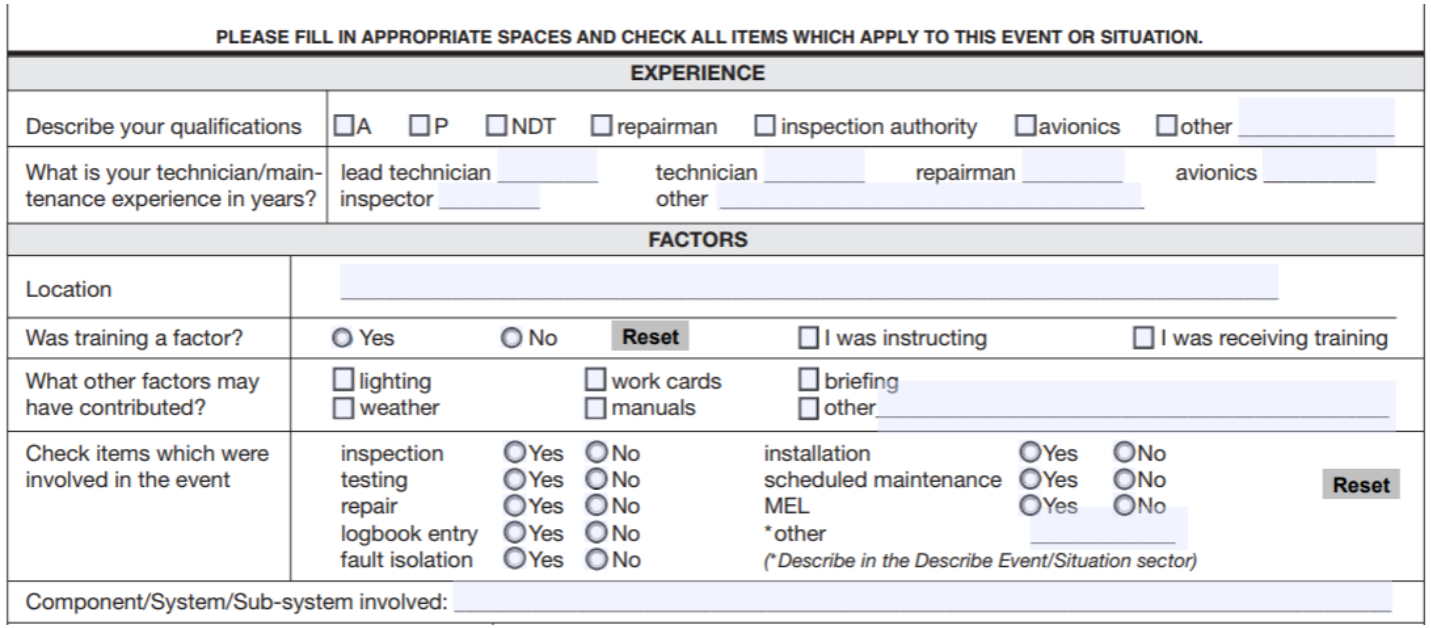
ASAP and human factors



PLEASE FILL IN APPROPRIATE SPACES AND CHECK ALL ITEMS WHICH APPLY TO THIS EVENT OR SITUATION.

EXPERIENCE

Describe your qualifications	☐A ☐P ☐NDT ☐repairman ☐inspection authority ☐avionics ☐other _____
What is your technician/maintenance experience in years?	lead technician _____ technician _____ repairman _____ avionics _____ inspector _____ other _____

FACTORS

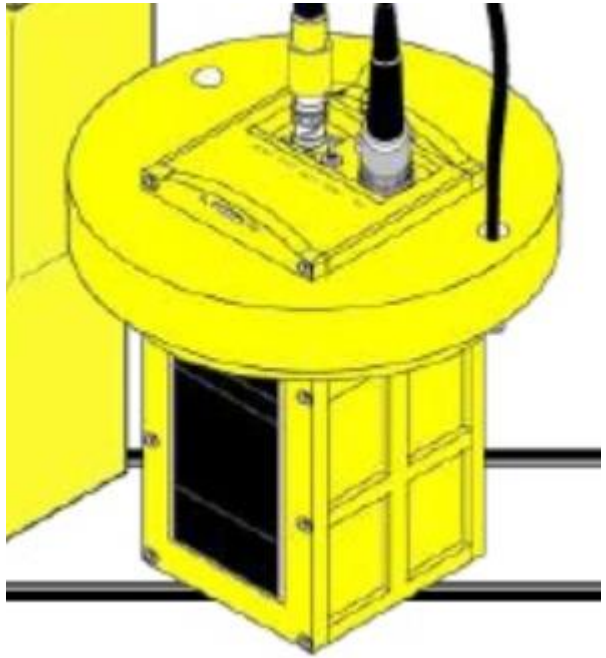
Location	_____
Was training a factor?	○ Yes ○ No **Reset** ☐ I was instructing ☐ I was receiving training
What other factors may have contributed?	☐ lighting ☐ work cards ☐ briefing ☐ weather ☐ manuals ☐ other _____
Check items which were involved in the event	inspection ○Yes ○No; testing ○Yes ○No; repair ○Yes ○No; logbook entry ○Yes ○No; fault isolation ○Yes ○No; installation ○Yes ○No; scheduled maintenance ○Yes ○No; MEL ○Yes ○No; *other _____ (*Describe in the Describe Event/Situation sector) **Reset**
Component/System/Sub-system involved:	_____

- AC 120-66 ASAP program
- Use ASAP data to drive the SMS process through hazard identification
- We have expanded our ASAP investigations to include human factors questions
- No mention of human factors or SMS in the AC

ASAP Wins

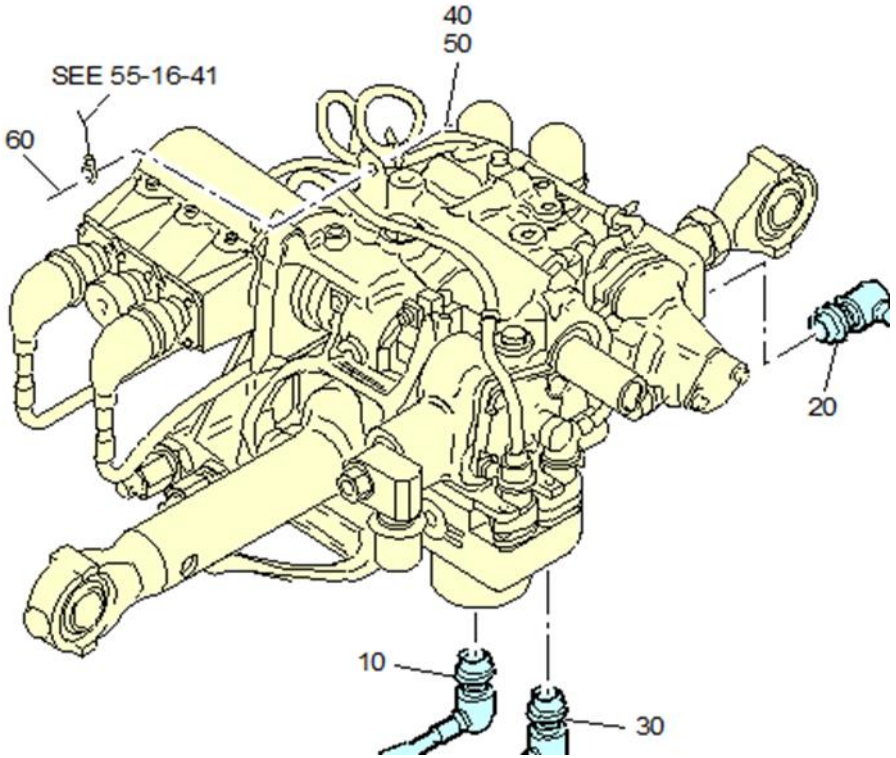
- Pilot IPAD install kit hardware too short, not providing adequate engagement. The AMT brought this issue up with the engineer and was told to just use longer hardware. The AMT filed a ASAP report as that wasn’t going to fix the root cause

ASAP wins



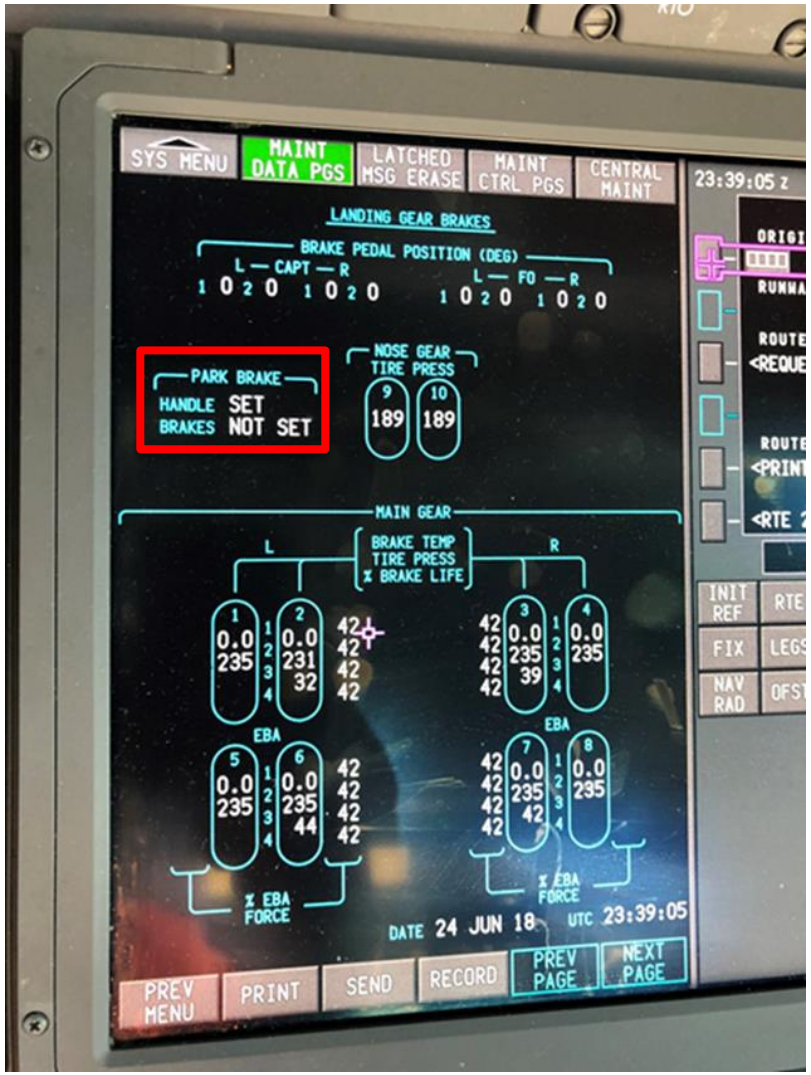
- AMT found AFT ELT switch in off position. Installed new ELT IAW AMM 25-65-35 in the ARM position. Checked the FWD ELT and found that switch in the off position. Seven other Airbus checked and found several switches in the off position and safety pins improperly installed. Corrected all of the discrepancies found. Fleet Campaign then checked other aircraft

ASAP wins



- Airbus elevator PCA replacement AMM paperwork did not include safety wiring the PCA rod end. Found that Airbus made an error and did not include the safety wire requirements in their latest updates
- A FCD was launched that identified additional aircraft with missing safety wire

ASAP wins



- 787 parking brake message
- Page shows handle set, brakes not set
- Working with Boeing to resolve

Key take aways

- Data, Data, Data…..
- Reporting tools like MLOSA, ASAP, and Floor Model needed
- RCA Investigations must include HF elements
- Start planning for integration of your Part 145 and other vendors

Questions?

Summary

- Challenges of Human Factors and SMS integration at an air carrier
- Maintenance LOSA
  - Ties to HF and SMS
  - Current LOSA distribution
  - LOSA wins
- Human Factors training and SMS
  - Historical HF training
  - Shift to SMS and local data driven training
  - HF Newsletter, engaging technicians
- Human Factors and fatigue
  - A4A Maintenance Fatigue Spec
  - Pulsar Informatics collaboration / project using data and SMS to access real time risk
- ASAP and HF/SMS integration
- Supporting SMS/HF integration (RCA tools, etc)
  - RCA importance in HF identification (ASAP, damage and injury investigations)