Transportation Safety Board

April, 2016

Safety management

Canada has been recognized as a leader in adopting a safety management system (SMS) approach to safety oversight

- Air carriers are required through regulation to manage operational safety through a data-driven, safety-culture approach

- This methodology places a greater emphasis on results and promotes carriers to develop, achieve and maintain viable safety-first cultures and operations

- The ability to manage your operations and safety programs through proven performance (data) versus a pure "compliance" based system is powerful

Safety management

Transport Canada guidance* describes safety oversight as:

- "…fundamental to the safety management process. Safety oversight provides the information required to make an informed judgment on the management of risk in your organisation."

Safety oversight is achieved through two principal means:

- Reactive processes for managing occurrences, including event investigation and analysis;

- Proactive processes for managing hazards, including procedures for hazard identification, active monitoring techniques and safety risk profiling

*Transport Canada Advisory Circular (AC) No. 107-001

Safety data sources

Reactive Data	Proactive Data

occurrence/incident reports

hazard reports

flight data monitoring (FDM)

fuel monitoring program

regulatory audits/inspections

line observation safety audits

CADORs

Training/assessment feedback

accident/incident investigation reports

internal/external audits (IOSA)

It starts with a promise...

COMPANY SAFETY PROMISE

Safety is one of WestJet's core values because we care deeply about the health and safety of one another and our guests.

Every WestJetter, partner and vendor is responsible for ensuring the highest level of safety at WestJet and is committed to:

- identifying hazards and risks before they become incidents
- sharing information on all safety issues
- reporting any condition, action or process that may affect safety
- continuous improvement

We pledge that no disciplinary action will be taken against any WestJetter for reporting a safety concern, except in cases of wilful non-compliance with regulations or company procedures or when a criminal act has been committed.

Gregg Saretsky

WestJet President and CEO
Transport Canada Accountable Executive

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Follow it up with a strong safety culture...

- A strong culture is critical to strong safety performance; in particular a "just" safety culture that;
  - encourages accountability
  - rewards reporting of hazards
  - places a high value on open and honest communication
  - empowers an employee group that is concerned and cares about the company and each other
- Our Safety, Security and Emergency Response systems are integrated and supported throughout the organization – caring, transparent and effective
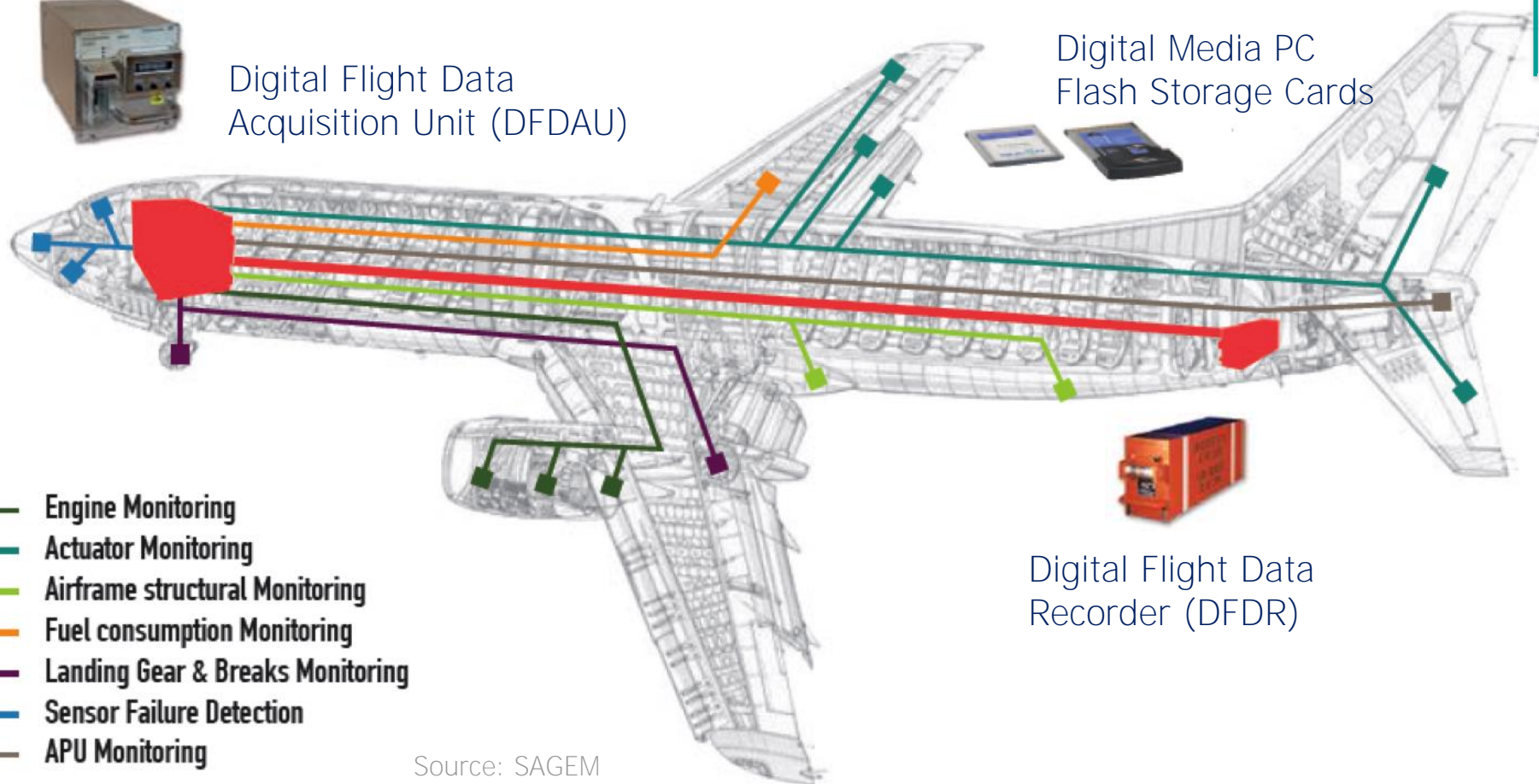

we
succeed
because
i care

Aircraft data systems

Aircraft Condition and Monitoring System (ACMS)

Digital Flight Data
Acquisition Unit (DFDAU)

Digital Media PC
Flash Storage Cards

Digital Flight Data
Recorder (DFDR)

- **Engine Monitoring**
- **Actuator Monitoring**
- **Airframe structural Monitoring**
- **Fuel consumption Monitoring**
- **Landing Gear & Breaks Monitoring**
- **Sensor Failure Detection**
- **APU Monitoring**

Source: SAGEM

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Aircraft data sources

Aircraft Condition and Monitoring System (ACMS)			
Digital Flight Data Acquisition Unit (DFDAU)			
Aircraft Communication Addressing and Reporting System (ACARS)		PCMCIA Data Dump Cards	Digital Flight Data Recorder (DFDR)
Manual Transmissions	**Automatic Transmissions**		
Manual ACARS transmission (HOWGOZIT)	Triggered ACARS reports – maintenance items	Aircraft flight data captured for flight operations quality assurance analysis (FOQA)– downloaded into system roughly once per week	Used for post incident/accident investigation only
Two-way text communication between OCC and the flight crew	ACARS "Squitter" report		
Controller Pilot Data Link Communications (CPDLC) controller and pilot data link for ATC communications	Flight Management Computer (FMC) position report	Aircraft Performance Monitoring (APM) – used for fuel monitoring; quality assurance and improvements to the flight planning system	
	Flight Management Computer (FMC) progress report		
	Engine trend monitoring data		

Data validation

Pilot Report:

FO was pilot flying. Cleared a visual approach, we were following the RNP short gate path to follow traffic closer in and slower. Changed to tower frequency and queried spacing to make sure all looked good. As I spoke with tower, the a/c captured the set altitude and was not set to field elevation upon crossing the first RNP waypoint. Resulted in a/c high on approach by the time new altitude was set. Path was recaptured but at 1000ft the a/c was too fast for a stabilized approach. Executed a normal go around to a normal landing.

Flight data monitoring (FDM)

Primary objective of WestJet's FDM program:

- To identify operating trends which indicate existing or future risks to flight safety and to resolve them in a proactive manner

Secondary and tertiary objectives:

- Help maintain effective safety barriers

- Help identify and determine underlying causes of procedural deviation

- Provides rich data to improve and/or validate training programs, operating procedure changes, maintenance programs and operational efficiency initiatives

- Data tells the what – not the why; it is important that flight data forms an input alongside the many complimentary safety programs, ensuring the best safety outcomes possible

Flight data monitoring (FDM)

Identified data is first reviewed by a pilot association gatekeeper who will initiate a crew call for validation, context and discussion of operating irregularities

FDM is not intended to monitor the performance of individual pilots; access to identifying data strictly limited to:

- WestJet Pilot Association (WJPA) gatekeepers;

- an FDM analyst;

- the Manager, Flight Safety (FDM Program Manager); and,

- the Team Lead, Safety Data Systems

Identifying information from the database will be deleted within 2 months of capture – all remaining analysis is of de-identified data

Flight data monitoring (FDM)

One of the successful programs utilizing FDM data is the management of de-stabilized approaches

Boeing defines a stabilized approach as meeting the criteria below no later than 1,000 feet above field elevation:

- aircraft in the final landing configuration; (gear down and landing flap)

- power setting appropriate for aircraft configuration;

- airspeed no greater than target +20 knots and trending towards target; and,

- on glide-path or assumed 3 degree glide-path

Flight data monitoring (FDM)

Event set criteria are analysed and used to drive awareness at our higher rate airports/runways through flight plan FDM alerts:

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BRIEFING ITEM  FDM LGA /001 FDM ALERT LGA

........................FDM ALERT........................
B737 NG FLIGHT DATA INDICATES AIRCRAFT LANDING RWY 04 HAVE A
HIGH RATE OF UNSTABLE APPROACHES.
-CAUSE-
HIGH APPROACH SPEED/HIGH DESCENT RATE


........................FDM ALERT........................
B737 NG FLIGHT DATA INDICATES AIRCRAFT LANDING RWY 31 HAVE A
HIGH RATE OF UNSTABLE APPROACHES.
-CAUSE-
HIGH APPROACH SPEED/HIGH DESCENT RATE
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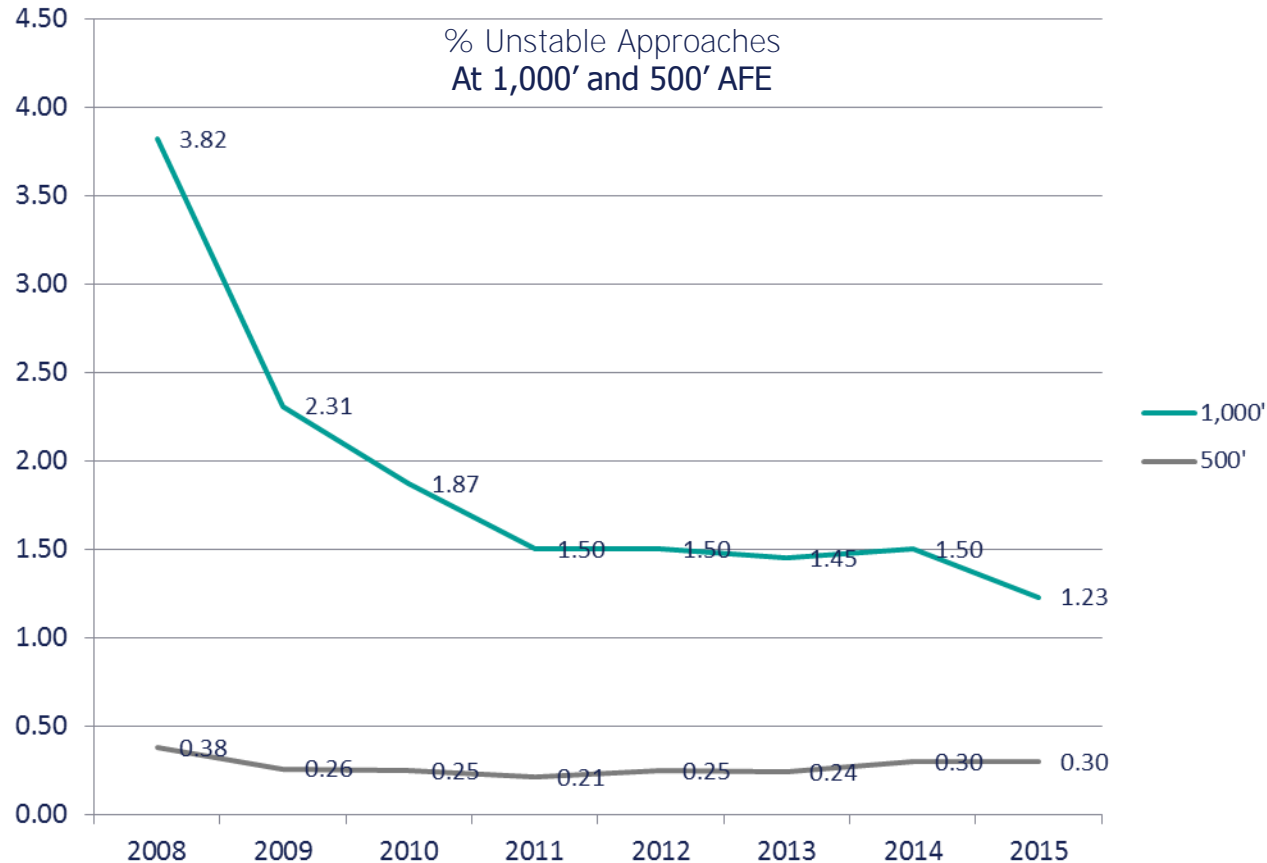
- Airports with higher than system average destabilized rates are readily identifiable and actively managed

CAUTIONS

- **High rate of unstable approaches.**
- When in visual conditions <u>configure early</u> and be prepared for a quick base turn resulting in a short final approach segment regardless of how other aircraft are being vectored.
- **Pay close attention to radio communications.** LGA is extremely busy.
- Ensure **transponder code** set properly for departure to prevent loss of separation.
- Advise approach controller when making **speed adjustments** of more than 20 knots.
- ASDE-X in use Transponder mode "C" all RWY's and TWY's.

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Flight data monitoring (FDM)

- WestJet's stated safety goal is to reduce our unstable approach rate to zero

- Current focus on Intl. destinations is to bring the unstable rate in line with the average rate of <1.5%

- 500′ unstable rate remains relatively steady at ~0.30%

% Unstable Approaches
At 1,000' and 500' AFE

1,000': 3.82, 2.31, 1.87, 1.50, 1.50, 1.45, 1.50, 1.23

500': 0.38, 0.26, 0.25, 0.21, 0.25, 0.24, 0.30, 0.30

Flight data monitoring (FDM)

- Trans-border destinations such as Las Vegas traditionally see higher rates of unstable approaches

- Active data driven focus on reduction through engineered solutions (RNP and RNAV visual approaches) and awareness through route qualifications, flight plan remarks and line and simulator training

% Unstable Approach Rate at 1000'AFE
Las Vegas (KLAS)

| Year	Rate
2010	5.00
2011	4.00
2012	3.50
2013	2.70
2014	3.80
2015	2.20
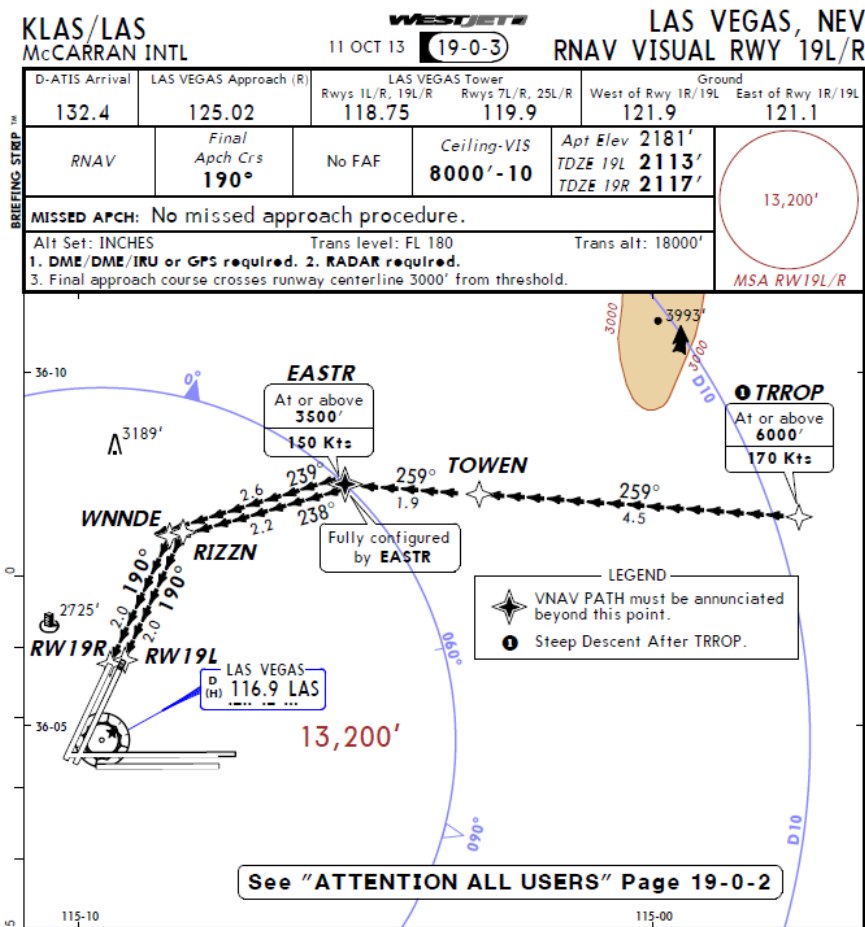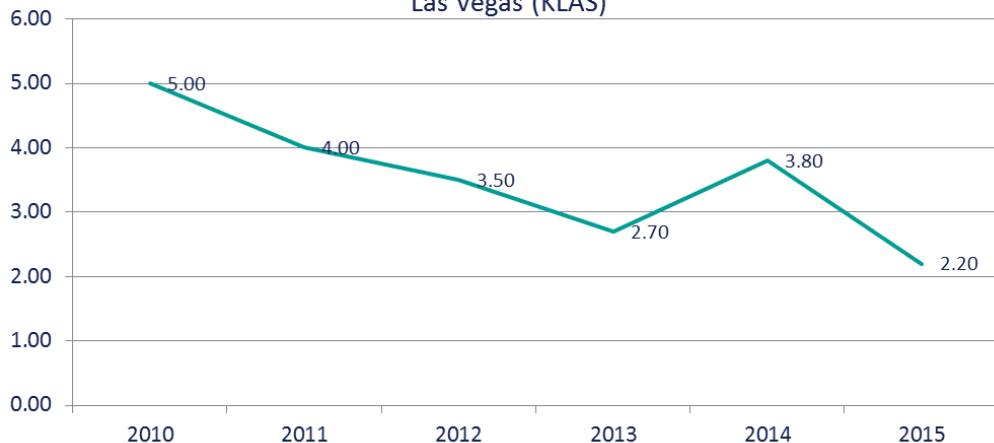
Flight data monitoring (FDM)

- Split Scimitar Winglets planned for the B738 fleet

- The ventral fin winglet will contact the ground with a body pitch angle of 10 degrees and a body roll angle of 7 degrees

- Use of flight data analysis to validate past operating envelope

- Similar data analysis used in SOP development for the introduction of first B737-800 tail strike risk model

Flight data monitoring (FDM)

PITCH AT LANDING B737-800
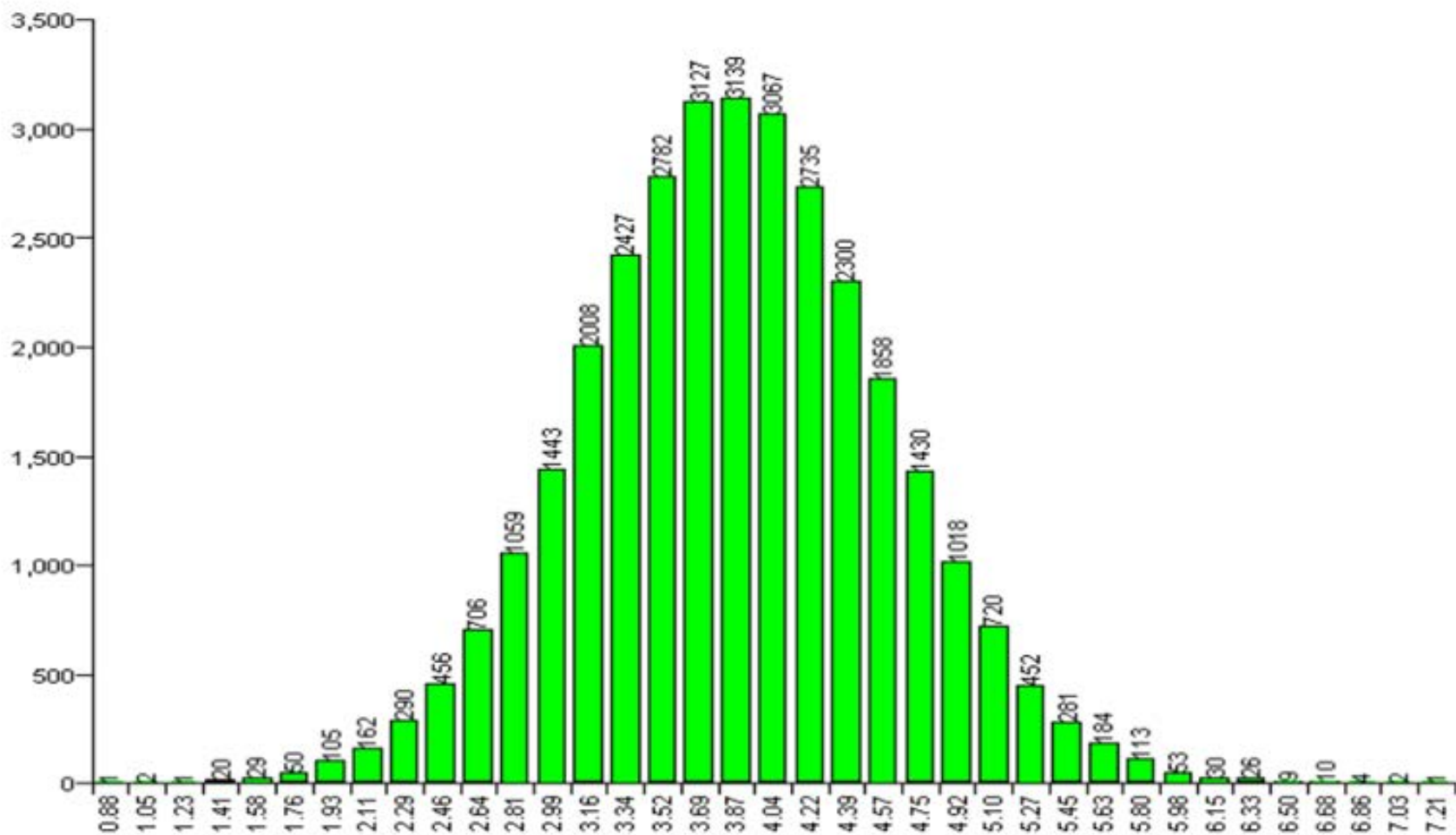
Safety data outcomes

Your next incident is likely already in your data…

- Results are as clear as they are predictable; we are bound to handle and use data appropriately… and responsibly

- "not knowing" is not acceptable…

- The better we get at sourcing and identifying data streams, the better we have to get at driving effective, corrective outcomes

- A robust reporting culture will lead to a comprehensive, data driven, forward looking, performance based safety risk management system

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Thank you