NTSB National Transportation Safety Board

Increasing
Business Aviation Safety
through SMS

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NBAA Safety Town Hall Meeting
October 7, 2008

Pinnacle Airlines Flight 3701
Jefferson City, Missouri

- October 14, 2004
- Bombardier Regional Jet
- Repositioning flight
- Both flight crewmembers killed

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What the investigation discovered

- Intentional activation of stall warning
- Swapping crew seats
- Rudder mishandling
- Climb to FL 410
  - "have a little fun"
- Automation mismanagement
- Airspeed loss, stall, loss of control, double engine failure

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Why was the crew at 41,000?

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"410 Club"

- Did the airline know about "410 Club?"

- How did the airline monitor and keep track of potential safety issues?

NTSB Finding

"All air carriers would benefit from Safety Management System programs because they would require the carriers to incorporate formal system safety methods into the carriers' internal oversight programs."

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NTSB Recommendation to FAA

"Require that all [air carriers] establish Safety Management System programs."

– NTSB Recommendation A-07-10

What is a Safety Management System?

"A SMS is an organized approach to managing safety, including the necessary <u>organizational structures</u>, <u>accountabilities</u>, <u>policies</u>, and <u>procedures</u>."

– *ICAO (Doc 9859 SMM)*

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When you have SMS, the company …

- **<u>Systematically</u>** attends to those things it believes are important.

- Manages and values safety, just as they manage and value other vital business functions.

  – Finance: CFO, General Accepted Accounting Practices (GAAP), procedures, controls, audits, accountability

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SMS Components

1. Written policies, procedures and guidelines

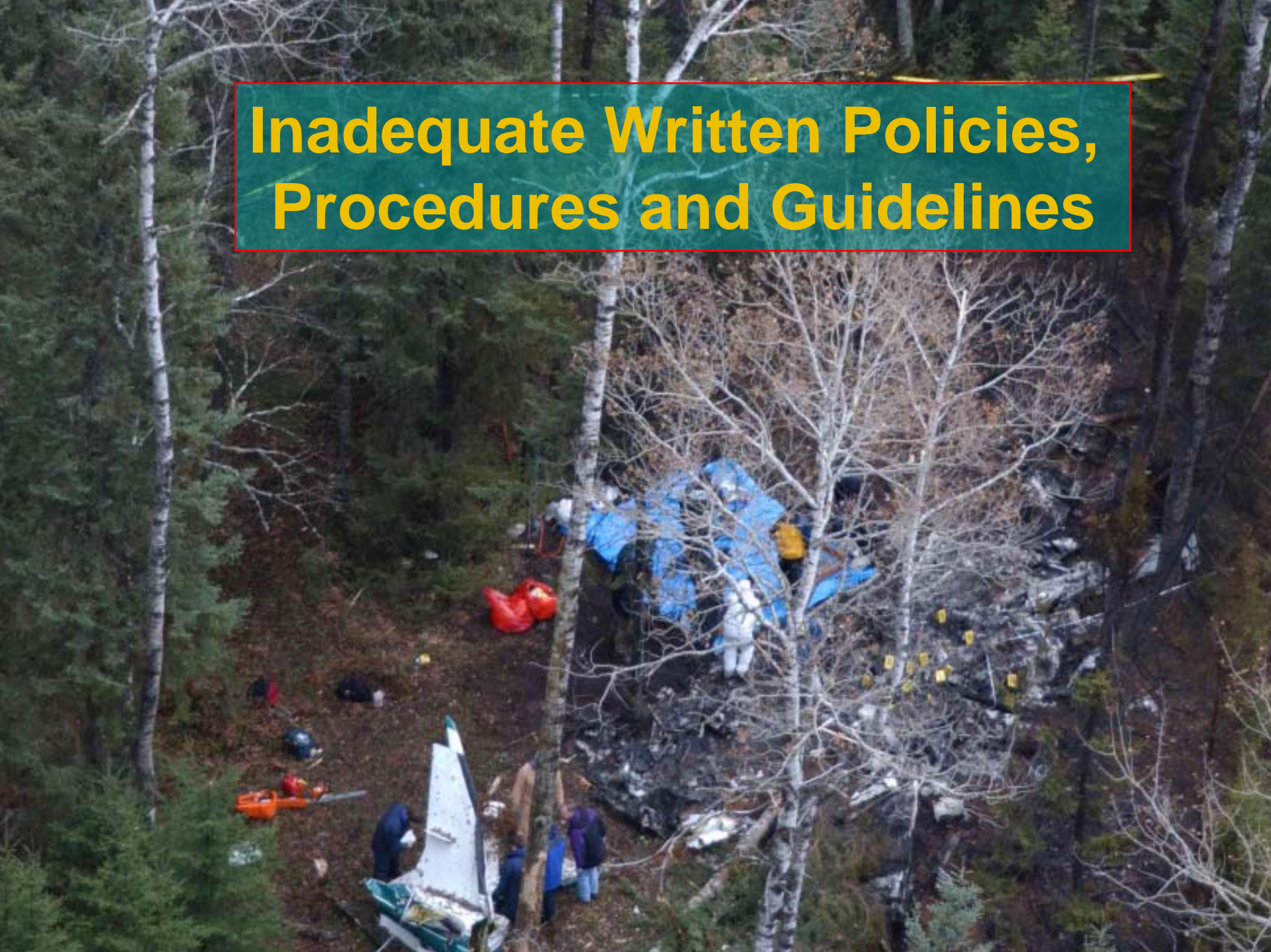2. Data collection and analysis

3. Risk management

4. Safety culture

SMS Components

1. Written policies, procedures, guidelines

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Potential Gaps

- The organization does not have adequate written policies, procedures and guidelines.

  – or –

- They don't rigorously adhere to what they do have.

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Inadequate Written Policies, Procedures and Guidelines

Inadequate procedures

- Key procedures for briefing and conducting instrument approaches were in "Maneuvers Guide"
  - Pilots were expected to adhere to procedures in "Maneuvers Guide"
  - "Maneuvers Guide" was only issued to the chief pilot and instructors

- Company pilot: never seen any standardized callouts documented in any company manual
  - To compensate, she used callouts she used at another company

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Non-Compliance

- Company check airman: rated company's standardization as "6" on a 1 – 10 scale.

- Lead ground instructor: "Fair"
  - Suspected that some pilots were following SOPs while others were not

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Declared Emergency

"Smoke in the cockpit."

"Shutting off radios, elec."

How would a pilot determine airworthiness?

- Most often a preflight fact sheet would be taped to airplane with highlighted items signed off by a mechanic

- Not a requirement, not spelled out in SOP

- No guidance was provided to PIC for determining airworthiness of assigned aircraft

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2. Data collection and analysis

Data collection and analysis

- How do you keep your finger on the pulse of your operations?

- Are you taking proactive measures to protect your employees and passengers?

- Do you have multiple data sources?

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Data leads to informed Risk Management

- "Hazards and incidents resulting from department operations shall be identified at all levels.

- "Conditions and acts posing unacceptable risk shall be eliminated or changed to prevent personal injury or illness and property damage or loss."

  – NBAA Prototypical Safety Manual

SMS Components

3. Risk Management

Risk Management

"We manage risk whenever we modify the way we do something to make our chances of success as great as possible, while making our chances of failure, injury or loss as small as possible."

– FAA System Safety Handbook

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Step 1: Identify Hazards

HAZARDS

- No precision approach

- No operational tower

Flight Safety Foundation

ALAR
Approach-and-landing Accident Reduction

Tool Kit

Approach-and-landing Risk Awareness Tool

Airport Services and Equipment

No approach radar service or airport tower service .... ⚠⚠⚠

No current local weather report .... ⚠⚠

Unfamiliar airport or unfamiliar procedures .... ⚠⚠

Minimal or no approach lights or runway lights .... ⚠

No visual approach-slope guidance — e.g., VASI/PAPI .... ⚠

Foreign destination — possible communication/language problems .... ⚠

Expected Approach

Nonprecision approach — especially with step-down procedure or circling procedure .... ⚠⚠⚠

Visual approach in darkness .... ⚠⚠

Late runway change .... ⚠⚠

No published STAR .... ⚠

Step 2: Assess Hazards

PROBABILITY

SEVERITY		Unlikely	Seldom	Occasional	Likely
	Catastrophic		3	4	4
	Critical	1	2	3	4
	Marginal	1	1	2	3
	Negligible	1	1	2	2

Hazard	**RAC**
No precision approach	3 (Seldom, Catastrophic)
No operational tower	3 (Seldom, Catastrophic)

Step 3: Make Risk Decisions & Develop Controls

- Develop risk control options, then decide if benefits outweighs risk.

Step 3: Make Risk Decisions & Develop Controls

HAZARDS

- No precision approach
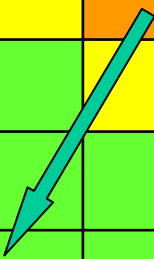- No operational tower

CONTROLS

We will not use this airport:

– between sunset and sunrise when control tower is closed, and
– when the weather is forecast below 800/2.

Determining Residual Risk

PROBABILITY

SEVERITY	Unlikely	Seldom	Occasional	Likely
Catastrophic	2	3	4	4
Critical	1	2	3	4
Marginal	1	1	2	3
Negligible	1	1	2	2

Hazard

No precision approach

No operational tower

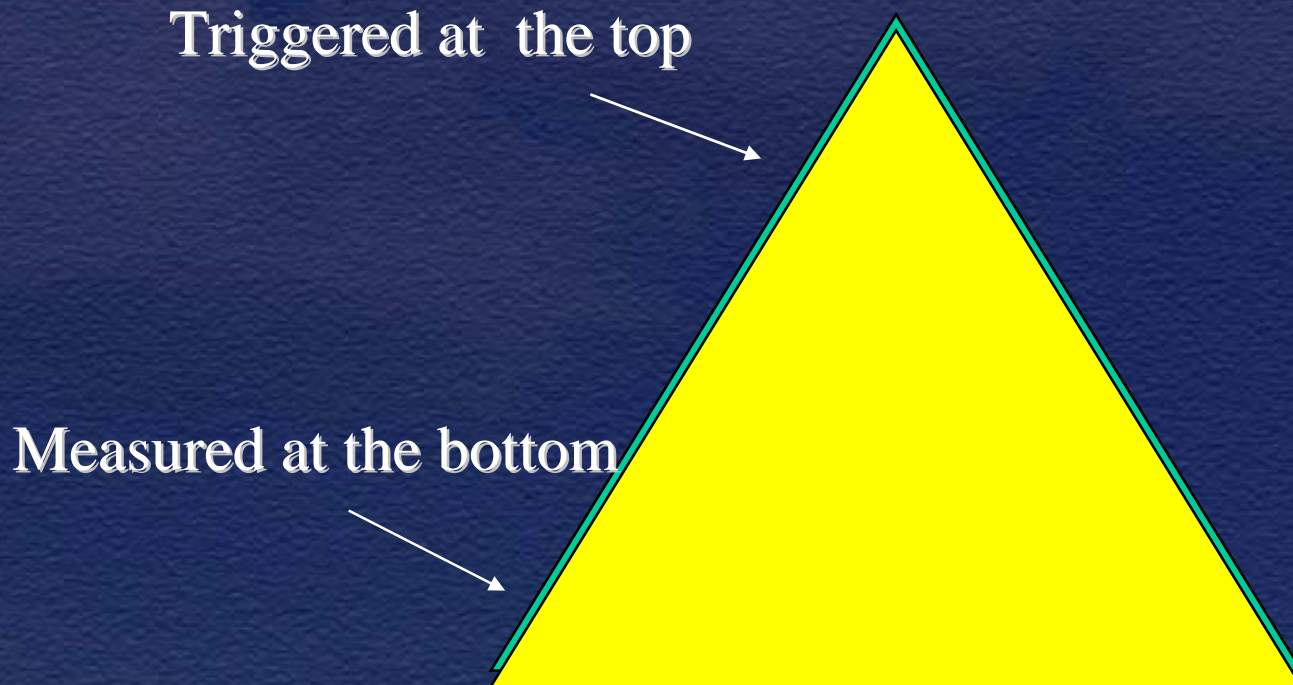**RAC**

1 (Unlikely, Negligible)

1 (Unlikely, Negligible)

Safety Culture

Do employees do the right things, even when no one is watching?

Corporate Culture is:

Triggered at the top

Measured at the bottom

Corporate culture starts at the top of the organization and permeates the entire organization.

SMS Components

1. Written policies, procedures and guidelines

2. Data collection and analysis

3. Risk management

4. Safety culture

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