NTSB National Transportation Safety Board

SMS:
What is it anyway?

Robert L. Sumwalt

March 3, 2009

Ashburn, VA

July 10, 2007, Sanford, FL

- Cessna 310 owned by NASCAR
- Flight planned Daytona Beach to Lakeland
- Inflight emergency, request for immediate diversion, crash
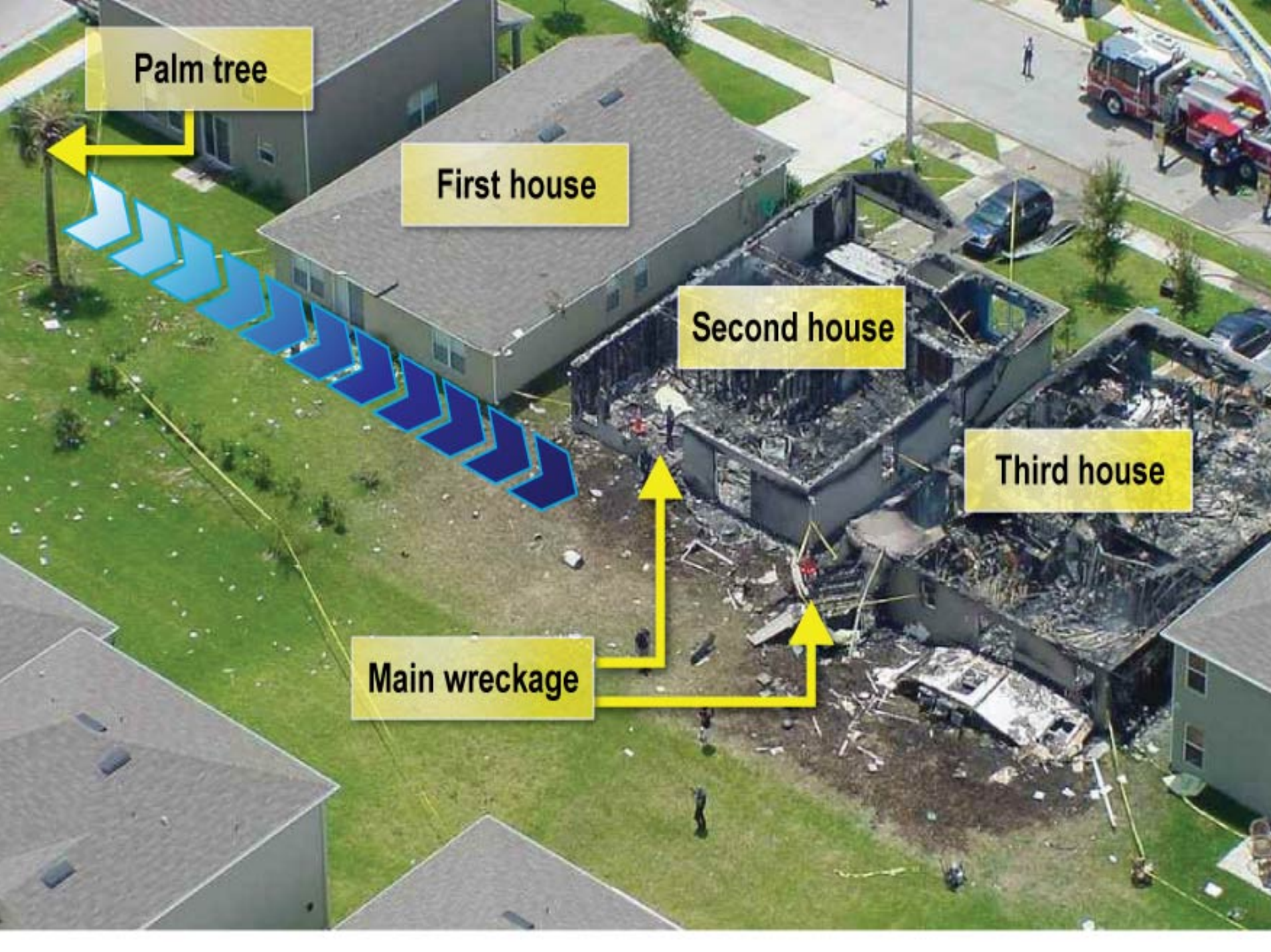- 5 fatalities

Declared Emergency
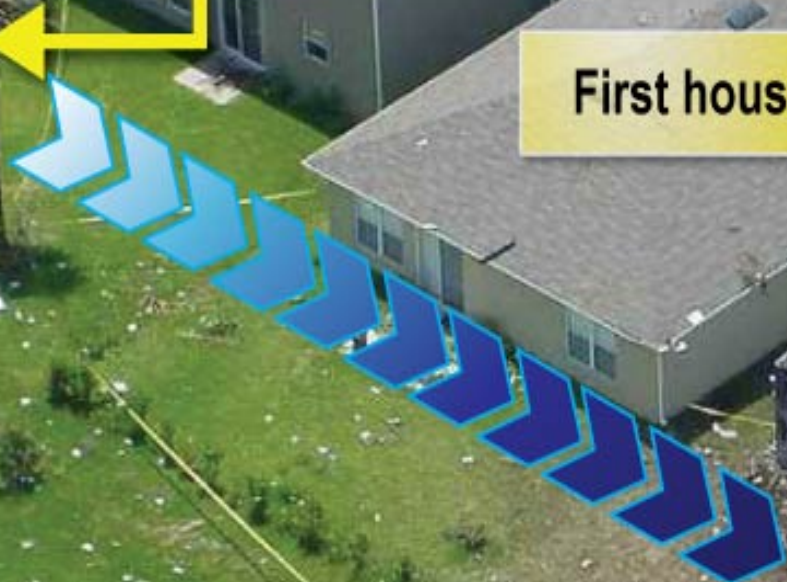
"Smoke in the cockpit."

"Shutting off radios, elec."

Pictures from Terry A. Boyd

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Palm tree

First house

Second house

Third house

Main wreckage

Pilots

- Left seat, PIC
  - NASCAR medical officer
  - Commercial Pilot Certificate
  - 276 total flight hours

- Right seat
  - Full time NASCAR pilot
  - ATP
  - 10,580 total flight hours

Maintenance Discrepancy Entry

Events - Previous Day

- Pilot followed company procedures
  - White original in airplane binder
  - Verbally informed technician
  - Handed yellow copy to DOM
- Brief in-office discussion
- Airplane not inspected, modified, or grounded
- Airplane remained available for flight

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Events - Accident Day

- Maintenance technician did not examine binder or airplane

- ATP dismissed radar issue as unimportant

- Pilots accepted airplane "as is"

- Weather radar circuit breaker likely reset for the flight

Organizational Processes

- Limited grounding authority
- Forms not serialized, tracked, or retained
  – Yellow copy never provided
- SOP guidance versus reality
- No assurance discrepancies would be addressed
- Airworthiness status unclear

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Synopsis

- Sufficient information available to all pertinent personnel

- Release and acceptance contrary to FARs and NASCAR SOPs

- Intervention opportunities ignored or circumvented

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NTSB Finding

"Safety Management System programs would provide corporate flight departments a formal system of risk management, safety methods, and internal oversight programs that could improve safety."

Probable Cause

- Actions and decisions by NASCAR's corporate aviation division's management and maintenance personnel to allow the accident airplane to be released for flight with a known and unresolved discrepancy, and;

- The accident pilots' decision to operate the airplane with that known discrepancy, a discrepancy that likely resulted in an in-flight fire.

NTSB Recommendation to FAA

Develop a safety alert for operators encouraging all Part 91 business operators to adopt Safety Management System programs that include sound risk management practices.

– NTSB Recommendation A-09-16

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NTSB Recommendation to FAA

Require that all Part 121 operators 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.

  - **Manufacturing:** Quality Control, ensuring products are produced within certain tolerances, standards
  - **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

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SMS Components

1. Written policies, procedures, guidelines

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 Procedures

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Inadequate Procedures

- No specific procedure for the director of maintenance to communicate maintenance status of an aircraft to anyone else within NASCAR.

- No procedures for providing flight operations personnel (pilots and dispatchers) with airplane airworthiness information.

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Inadequate Procedures

- 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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Non-Compliance

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Non-Compliance

- Aviation director could not readily locate SOP manual
- SOP manual viewed as a "training tool."
- Aircraft to only be used for company business
  - Accident flight was a personal flight
- PIC must possess ATP
  - PIC did not possess ATP
- Last 3 maintenance discrepancies had not been addressed

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SMS Components

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?

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

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3. Risk Management

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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

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

S E V E R I T Y

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
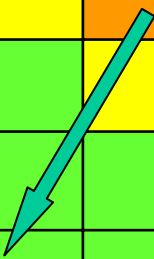- No operational tower

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

S E V E R I T Y		Unlikely	Seldom	Occasional	Likely
	Catastrophic	2	3	4	4
	Critical	1	2	3	4
	Marginal	1	1	2	3
	Negligible	1	1	2	2

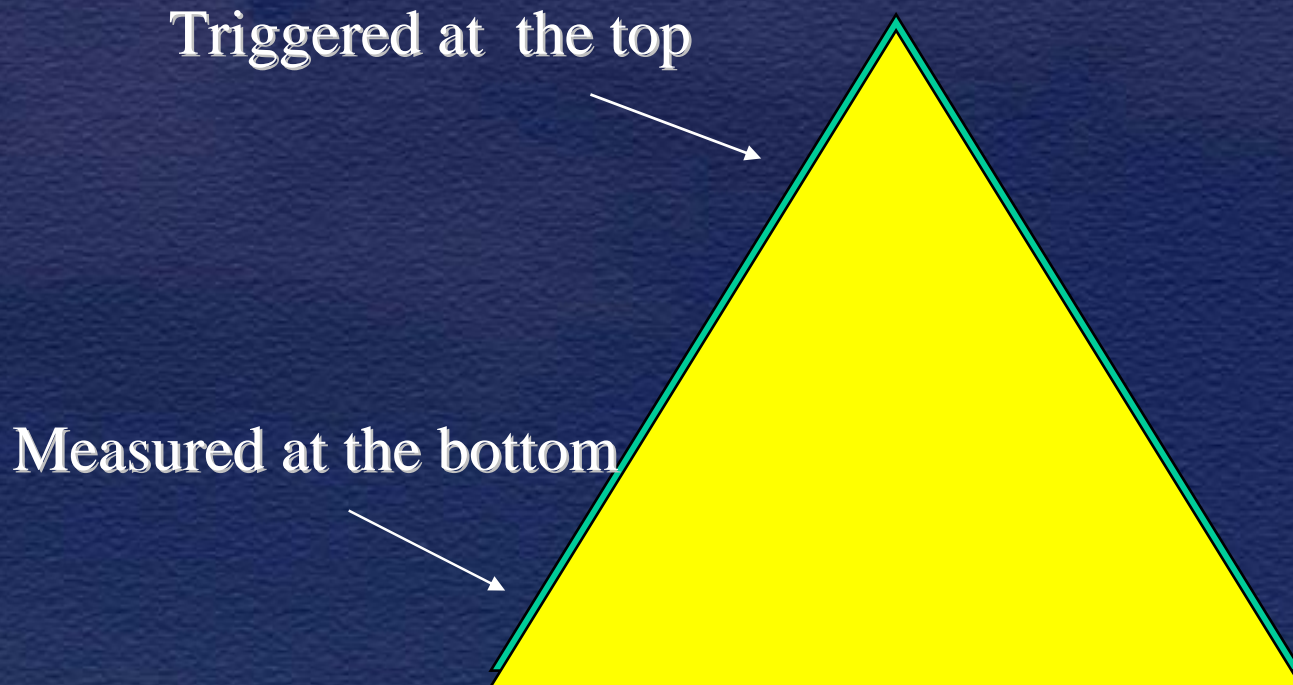| **Hazard**	**RAC**
No precision approach	1 (Unlikely, Negligible)
No operational tower	1 (Unlikely, Negligible)

4. Safety Culture

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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

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