

How Best Practices Can Improve Ground Handling

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Best Practices

What exactly are WE TALKING about?

My way is better
than yours!

This is the way it
comes from the
manufacturer!

We've been doing
it this way for 20 years!
. . . So it must be right!

This is the way I was
trained!

WE ARE TALKING ABOUT . . .

SAFETY!



WE ARE TALKING ABOUT...

**How you  can improve
your company's performance, your
safety performance - - - - -**



***by merely looking closely at
your operation.***

But How? In What Form?

- **Different styles....such as:**
 - **Process or Compliance Focused**
 - **Audit (Formal Style Such As An Internal Evaluation - IEP)**
 - **Assessment or Evaluation**
 - **Random Survey (Informal)**
 - **Observation (Such as a Gate Observation)**
 - **or....**
 - **IGNORE IT AND IT WILL GO AWAY !**

One Proven Method or Best Practice

PROCESS ASSESSMENT

The Process Assessment

- **Type: Process Based and Compliance Testing**
- **Experience Level: Skilled Evaluation Team**
- **Defined Methodology . . . ISO 9001**
- **Standard - The Regulations, Company Manual, Manufacturers Recommended Practices.**

Plus:

- **Daily Briefings, Written Reports, Photographs, Follow Up**
- **Integration of Findings into Corrective Action Plan**
- **Periodic Re-Evaluation**

Safety Architecture Overview

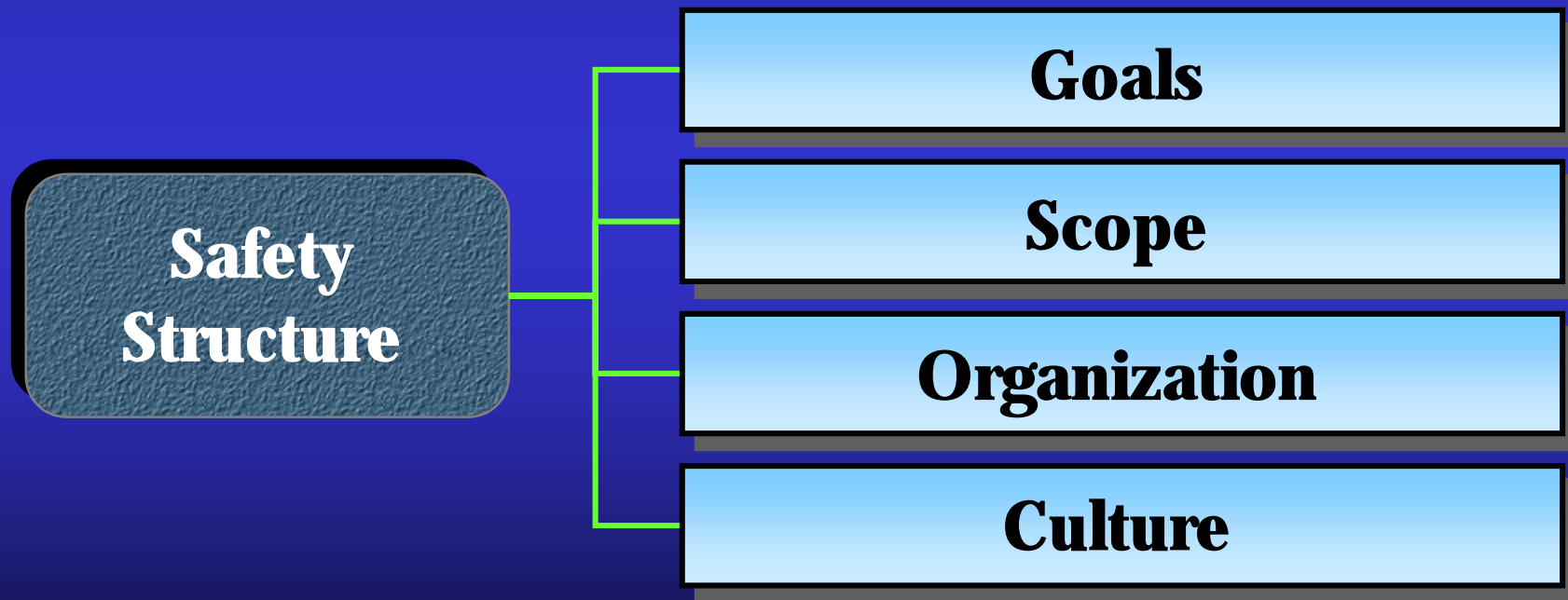
Definition

- The “Safety Structure”, “Technical Programs” and “Risk Management” system that forms an operator’s overall safety and operational integrity program.



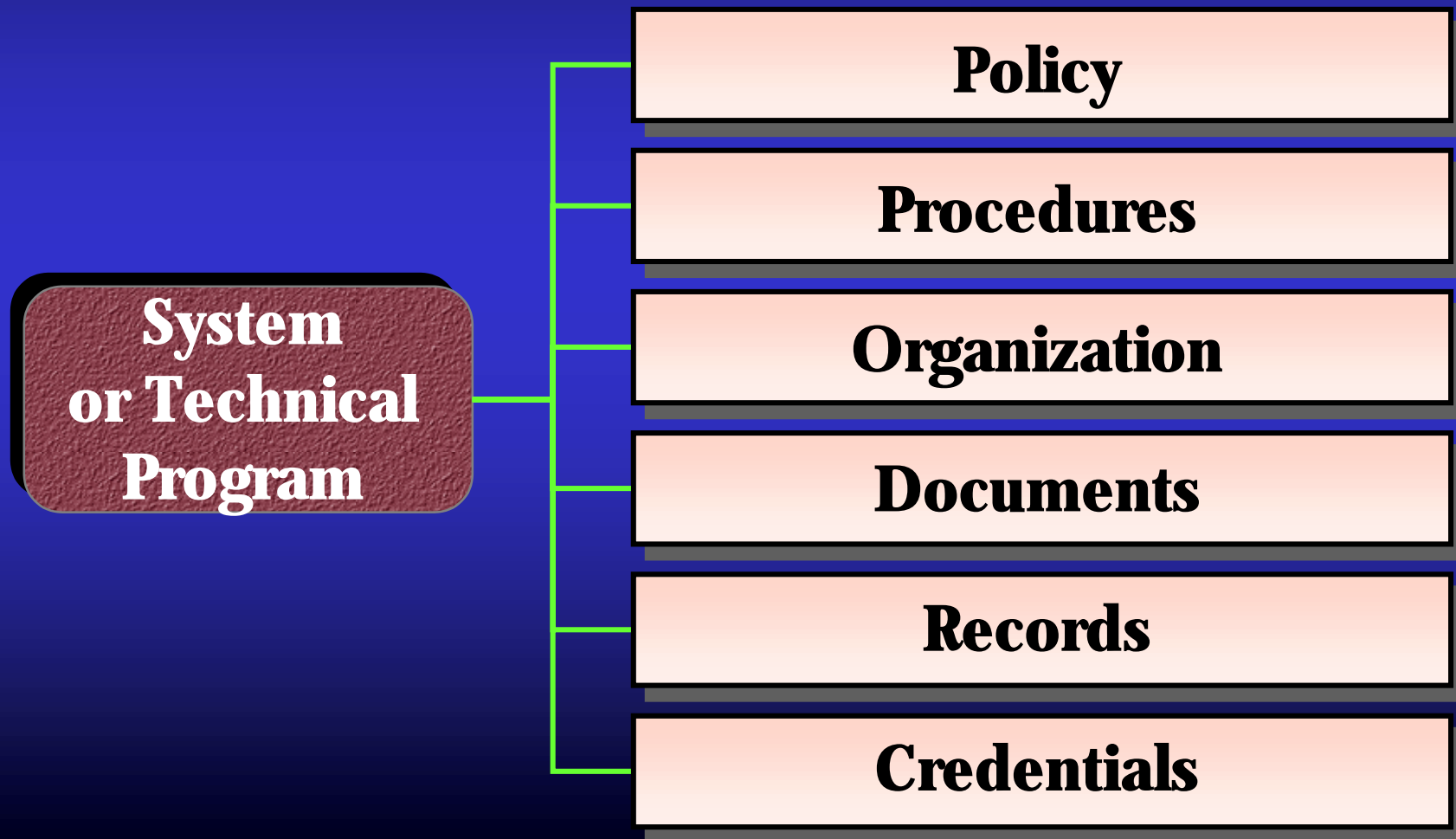
Safety Architecture

“Safety Structure”



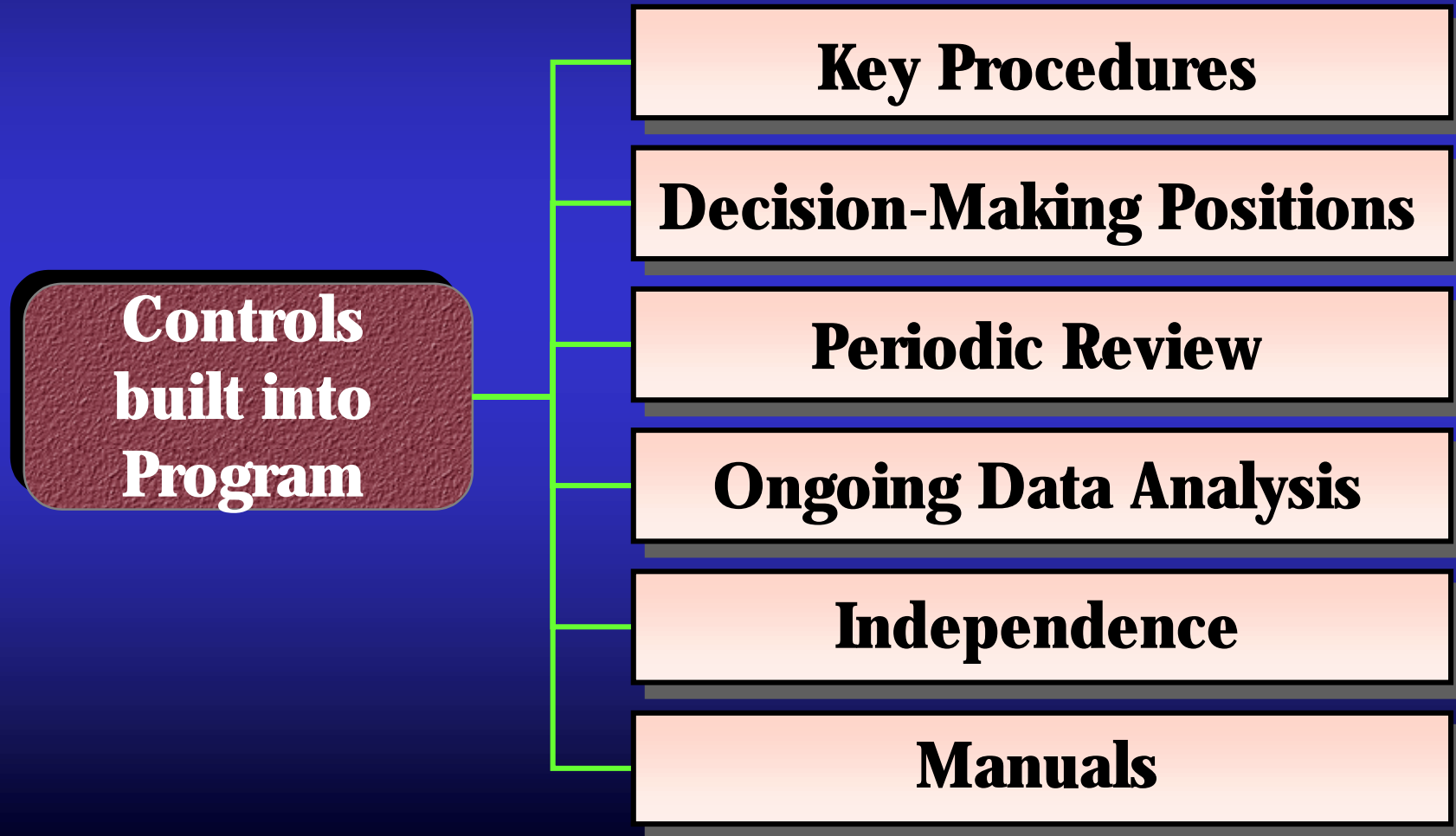
Safety Architecture

“System Integrity”



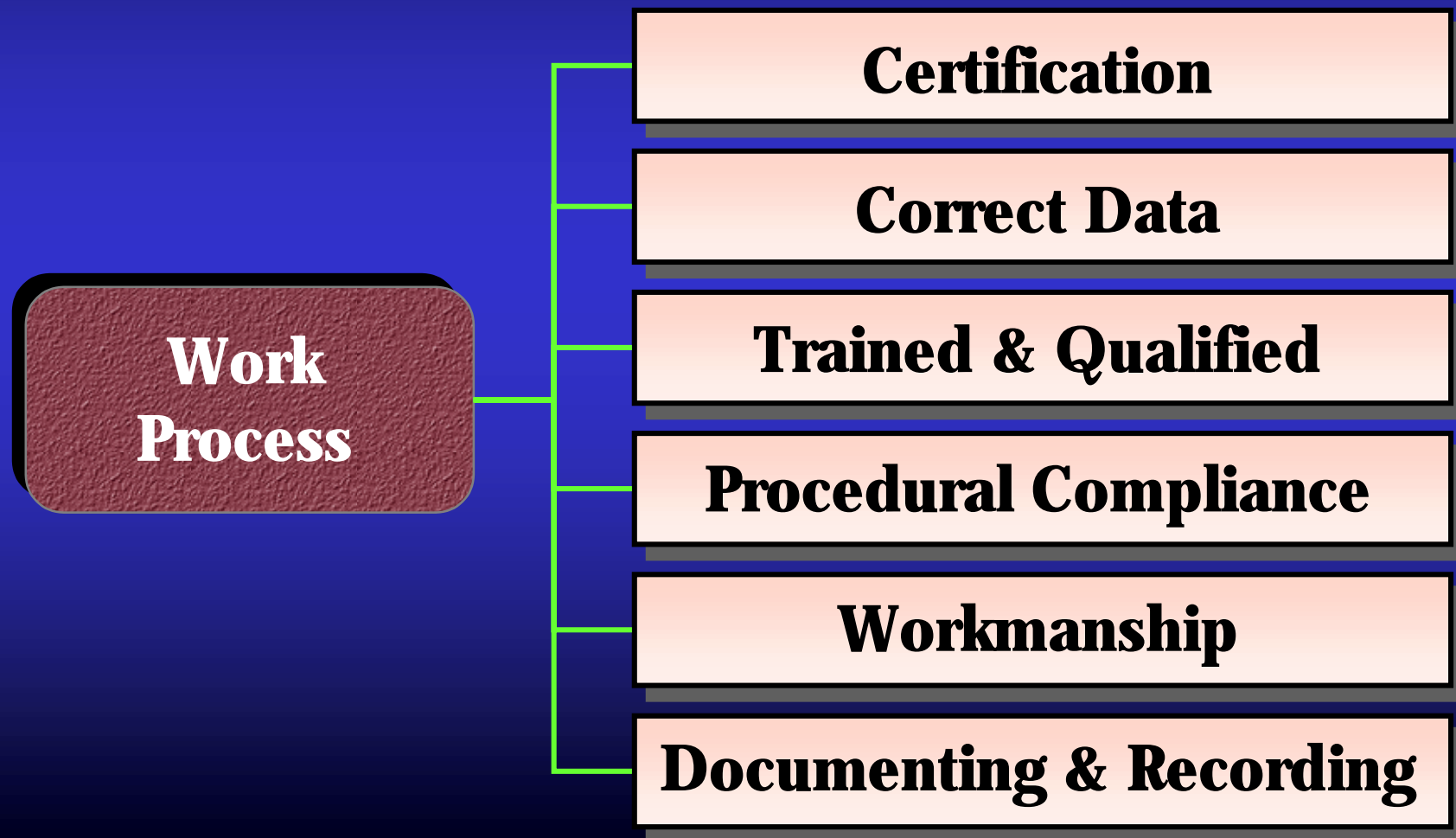
Safety Architecture

“Controls”



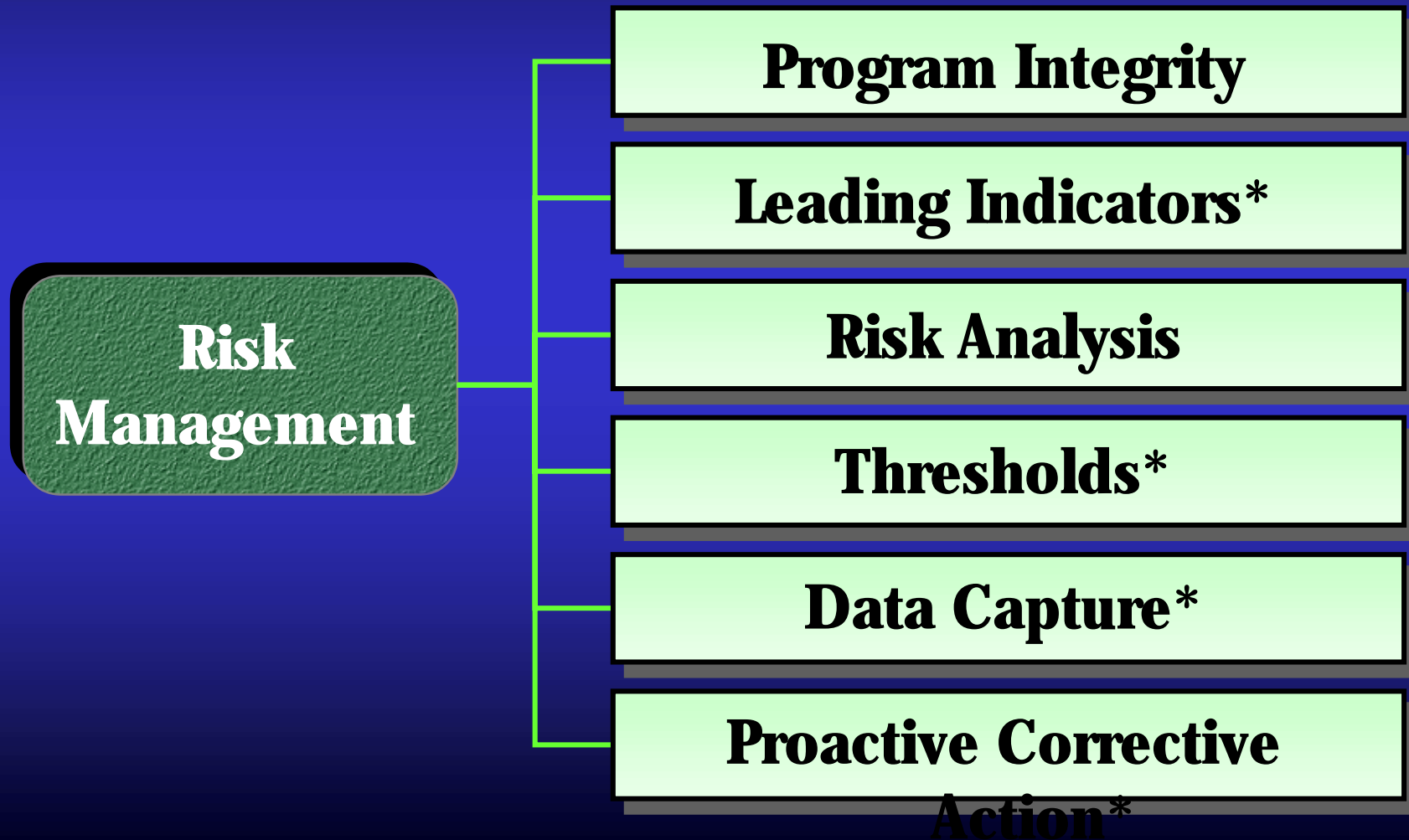
Safety Architecture

“Work Process or Sampling for Compliance”



Safety Architecture

“Risk Management (Built Into IEP Process)”*



FAA - AC 120-59

Air Carriers Internal Evaluation

Public safety is enhanced if deficiencies are identified and immediately corrected when they are discovered by the *Operator* rather than when they are discovered by the FAA*.
(*or you could say by Accident - Literally !)

**Or...You Could Have Chosen
to Ignore it. But then...**



MISTAKES

**IT COULD BE THAT THE PURPOSE OF YOUR LIFE IS
ONLY TO SERVE AS A WARNING TO OTHERS**

Common Claims By Ground Services Vehicles

- **VEHICLES TRAVELING TOO FAST ON THE RAMP**

Ramp Slope / Wet / Icy / Snowy

- **UNDER-POWERED TUGS TOWING AIRCRAFT**

- **UNATTENDED VEHICLES ON THE RAMP**

Left running / Unchocked / Without brakes set

- **WINGWALKERS WITHOUT PROPER EQUIPMENT**

Heavy duty chocks / Lit wands / Whistles / Reflective Vests

- **DRIVING GROUND SERVICES VEHICLES ON & OFF AIRPORT**

Service roads / Public access roads

- **RAMP AWARENESS**

This is Huge...

SYNOPSIS

Gulfstream G-IV being towed from maintenance hangar to the front ramp when tug jackknifed and towbar broke. The aircraft over-ran the tug causing impact and extensive damage to the left wing plank.

DAMAGE

Replace Wing Plank

Repair Costs \$700,000

Loss of Use \$140,000

Diminution (\$28 million aircraft)

INVESTIGATION

- Under-powered tug (4,000 lb. drawbar pull)**
- No brakeman in cockpit**
- Unlevel taxiway**

REVIEW

- Towing Operations**
- Flight Crew Responsibilities**
- Aircraft Manufacturer's Tug Requirements**

GULFSTREAM AEROSPACE
GULFSTREAM IIB MAINTENANCE MANUAL

NOTE: The use of a towing vehicle with a drawbar pull of 12,000 pounds is conservative. A smaller vehicle may be adequate in some areas. In dry conditions a towing vehicle with a drawbar pull of 8000 pounds minimum is adequate for the GIIIB, up to a gross weight of 88,000 pounds. For ice and snow conditions, a towing vehicle with a drawbar pull of 12,000 pounds is recommended.

- (4) A qualified person must be stationed in the cockpit during all towing operations to watch for hazardous conditions and to stop the aircraft in the event the towbar becomes disengaged from the towing vehicle.
- (5) Ensure gust lock is in ON.
- (6) Check hydraulic brake accumulator gage for available pressure. Fully charge the accumulator if pressure is below 2000 psi minimum required pressure.

NOTE: Six full applications of the parking and emergency brake system can be made with a fully charged accumulator (3000 psi).

CAUTION: NOSE WHEEL STEERING UNIT MUST BE DISCONNECTED PRIOR TO TOWING AIRCRAFT. ROTATION OF NOSE WHEELS BEYOND THEIR NORMAL LIMITS OF TRAVEL (82°) CAN CAUSE SERIOUS DAMAGE TO STEERING UNIT. WITH STEERING UNIT DISCONNECTED, NOSE WHEELS ARE FREE TO ROTATE 360°.

TO PREVENT POSSIBLE DAMAGE TO NOSE WHEEL SELF-CENTERING CAMS, DO NOT TOW AIRCRAFT IF DIMENSION "X" AS SHOWN ON NOSE GEAR STRUT INFLATION INSTRUCTION PLATE EXCEEDS 11.00 INCHES.

- (7) Ensure landing gear is free of obstructions and brakes are released.

CAUTION: BEFORE PROCEEDING TO TOW AIRCRAFT, ENSURE THERE IS ENOUGH CLEARANCE AT WING TIPS IN EVENT A TURN IS REQUIRED. DUE TO WING SWEEPBACK, WHEN AIRCRAFT IS TURNED, WING WILL SWING OUT AS IT COMPLETES AN ARC. ON SHARP TURNS, TAIL WILL REQUIRE MORE CLEARANCE THAN WINGS.

MAIN ENTRANCE DOOR SHOULD EITHER BE CLOSED OR SUPPORTED WITH A JURY CABLE (P/N 1159SEM20105) BEFORE TOWING. DAMAGE TO MAIN ENTRANCE DOOR CAN RESULT IF THIS PROCEDURE IS NOT ADHERED TO.

- (8) Tow aircraft making smooth starts and stops with towing vehicle. Tow in low gear only. Station wing and tail walkers as necessary to ensure clearance between aircraft and adjacent structure equipment. It is desirable to establish some form of communications between towing vehicle operator and the qualified person in the cockpit.

CAUTION: USE EXTREME CARE TO PREVENT AIRCRAFT FROM OVERRIDING TOWING VEHICLE.

WHEN TOWING FROM MAIN GEAR, PULL STRAIGHT AHEAD ONLY.

- (9) If aircraft is to be towed from soft sand, earth or mud, or anytime it is determined that towing from the nose gear will exceed the towbar structural limitations, the main gear must be used to tow aircraft. This is accomplished utilizing the method shown in Figure 202. It is desirable that the aircraft be defueled when towing in this configuration. Limit each towing vehicle to 20,000 pounds maximum pull.

2. Towbar Shear Pin — Inspection

CAUTION: DO NOT, UNDER ANY CIRCUMSTANCES USE ANY OTHER TYPE OF SHEAR PIN IN PLACE OF NAS1333C2C45 SHEAR PIN. PINS OF A LESSER SHEAR STRENGTH COULD CAUSE SHEARING DURING NORMAL TOWING LOADS. USE OF A PIN WITH A HIGHER SHEAR STRENGTH COULD CAUSE EXCESSIVE LOADS TO BE IMPOSED ON THE NOSE GEAR, WITH POSSIBLE DAMAGE.

FAILURE OF SHEAR PIN WHILE AIRCRAFT IS IN TOW RESULTS IN SEPARATION OF TOWBAR.

9-1-0

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Manufacturer	Aircraft Type	Recommendation for Brakerider?
Canadair	CL-604 (and all others)	YES. "... The second person operates the aircraft brakes in the flight compartment..."
Cessna	Citation X (and all others)	YES. "... When towing, always have a qualified tow vehicle operator, a person who is familiar with operating the hydraulic system and brakes in the pilot seat, and..."
Falcon Jet	900, 900EX, 50, 50EX, 2000	YES. (No supporting copies of manual.)
Gulfstream	II, III, IV, V	YES. "... Qualified brake rider must be in cockpit during all towing operations. ..."
Raytheon	800XP, Starship (and all other turbines)	YES. "... Station a competent brake operator in the flight compartment. ..."
Learjet	All	YES. "... Station one person in the flight compartment during towing to ensure the aircraft can be stopped should the tow bar separate from the aircraft. ..."

SYNOPSIS

While towing Gulfstream G-II from parking to on-line departure location, aircraft overran tug, causing impact with right wing. The ramp was flat and dry, but during a turn, the lineman attempted to slow down and the aircraft began to push the tug, and then it jackknifed.

DAMAGE

- Right inboard leading edge**
- Two wing planks**
- Wing replacement \$1.5 million**
- Loss of Use \$500,000**

INVESTIGATION

- Underpowered tug**
- Speed and braking during towing operation**
- Wing replacement due to wing plank availability (18 month lead time)**

REVIEW

- Towing Operations**
- Aircraft Manufacturer's Tug Requirements**

SYNOPSIS

Lineman left tug running in neutral with parking brake set while he entered hangar to open main door. Tug jumped into gear and struck right side fuselage of Lear 24D parked inside hangar.

DAMAGE

Aircraft Damage	\$20,000
Loss of Use	\$40,000

INVESTIGATION

- Transient aircraft parked in hangar overnight**
- Worn transmission**
- Cold weather operation**
- No contract with claimant**

REVIEW

- Ramp procedures**
- Progressive maintenance on ground service vehicles**

SYNOPSIS

The FBO controls an access gate to the ramp at an international airport. A private van company dropping off passengers for a corporate aircraft were escorted onto the ramp by the FBO. The escort vehicle leaves the van to find his own way off the ramp of the airport. The van operator looking for the exit of the airport, strikes the right wing of a Gulfstream G-III.

DAMAGE

Repair cost (splicing of lower plank)	\$250,000
Loss of Use	\$70,000

INVESTIGATION

- FBO issued summons for violation of the airport regulations**
- Hangarkeepers claim for the care, custody and control of the aircraft**
- Van operator had \$100,000 insurance**
- Plank replacement estimated \$1 million**
- Aircraft sustained loss value/diminution**

REVIEW

- Responsibilities of maintaining and operating an airport access gate**
- Escorting vehicles on and off airport premises**

SYNOPSIS

Fuel truck (8,000 gal Refueler) enroute to fuel farm struck left outboard wing of a stationary aircraft during a push-back operation. Approximately 7 feet of the aircraft wing was protruding in service road while the ground crew was disconnecting the towbar for departure. Seven feet of the wing was torn off and imbedded in the fuel truck, which continued on the roadway and came to rest 40 feet beyond the aircraft.

DAMAGE

- Extensive damage to left outboard wing**
- Aileron replacement**
- Repairs estimated at \$1.4 million**
- Approximately 3 months down time of aircraft**

INVESTIGATION

- Wing lighting , Vehicle movement on service road, Wing walkers positioning.**

REVIEW

- Night operations**
- Ramp awareness**
- Wing walkers**

SYNOPSIS

During weight and balance of procedure, the aircraft was jacked in a nose high attitude for proper weight distribution. As the aircraft was being jacked, a tail stand was placed under the aircraft, as a precaution due to tail heavy conditions with no interior in the aircraft. The mechanics lowered the aircraft without removing the tail stand causing damage to the lower aft fuselage.

DAMAGE

- Replace Skin**
- Repair Frame**
- Repair Cost \$167,913.98**
- Loss of Use \$285,100.43**

INVESTIGATION

- Aircraft out of service 2 months**
- Part 91 operator**
- Maintenance crew coordination**

REVIEW

- Jacking procedures**
- Maintenance procedures**

SYNOPSIS

After painting aircraft, mechanic failed to remove all masking material from a nose gear actuator. On delivery flight, landing gear would not completely extend.

DAMAGE

- Propeller**
- Engines**
- Gear Doors and Flaps**
- Repair Cost** **\$ 850,000.00**
- Loss of Use** **\$ 40,000.00**
- Diminution** **Demand 20% on 1.5 million aircraft**

INVESTIGATION

- Small pieces of masking tape found in nose actuator**
- Initial flight after maintenance**

REVIEW

- Painting procedures**
- Preflight procedures**

SYNOPSIS

An unattended pick-up truck, traveled 70 feet in reverse and struck a parked MD-80 aircraft, damaging the nose gear.

DAMAGE

- Aircraft nose gear**
- Repair Cost \$70,000.00**

INVESTIGATION

Unattended vehicle. Agent alleges the truck was left in park when he exited the vehicle.

REVIEW

- Vehicle operation procedures**

SYNOPSIS

During a pre-purchase inspection, a mechanic was taxiing an aircraft out to test run the engines when it struck a parked tug. The aircraft had no hydraulics so the mechanic could not steer or brake. The engines were shut down and the aircraft's right side fuselage ran into the tug, knocking it over.

DAMAGE

- Severe damage to nose gear door, well and bulkhead assembly**
- Replace 7 fuselage skin panel on the right side**
- Four punctures to pressure vessel**

Repair costs \$270,000

Loss of Use \$300,000

Diminution (Demand 10% of \$14 million value)

INVESTIGATION

Circuit breakers pulled

REVIEW

- Aircraft familiarization**
- Start-up procedures.**

Thank You