



Kennedy Space Center Safety Program Status Report

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Metrics
FY 2005

Metric	Civil Service	Contractor
Lost Time Injuries	3	64
Lost Time Injury Rate	0.17	0.58
Restricted Duty Injuries	8	69
Days Away/Restricted Rate	0.62	1.21
Total Injuries	21	277
Total Case Injury Rate (TCIR)	1.19	2.53
Damage Cost	\$500.00	\$226,870.00
Close Calls	23	311



Metrics FY 2006 (through Nov.)

Metric	Civil Service	Contractor
Lost Time Injuries	0	8
Lost Time Injury Rate	0	0.48
Restricted Duty Injuries	0	8
Days Away/Restricted Rate	0	0.97
Total Injuries	4	24
Total Case Injury Rate (TCIR)	1.35	1.45
Damage Cost	0	\$228,000.00
Close Calls	0	33



Significant Mishaps Cable Pull Hand Injury

- On December 7, 2005 a DOD contractor was using an air pressure device to shoot a mandrel through a conduit for the purpose of installing cable.
- When the mandrel became entangled with string and would not go through the conduit, the workers tried to free it by pulling on the string and applying air pressure.
- The employee on the receiving end was standing in close proximity to the conduit when the mandrel broke loose and exited the conduit striking and going through the employees left hand.
- This was a DOD mishap that occurred on NASA property.





Significant Mishaps OSB II Cable Pull

- On August 11, a contractor performing demolition work inadvertently pulled to the surface an energized 13,800 volt electrical feeder and a portion of the concrete duct bank that it was routed in.
- The proximate cause was the use of heavy equipment to remove communication cables that ran directly beneath the duct bank.
- An inspector had directed workers to remove three exposed lead splice casings by cutting the cables away from them due to possible environmental concerns.
- Instead of cutting, workers tried to salvage the cables by using heavy equipment to pull them out of the ground.
- The feeder and the concrete duct bank that contained it were forced up out of the ground as a result of the cables being pulled.





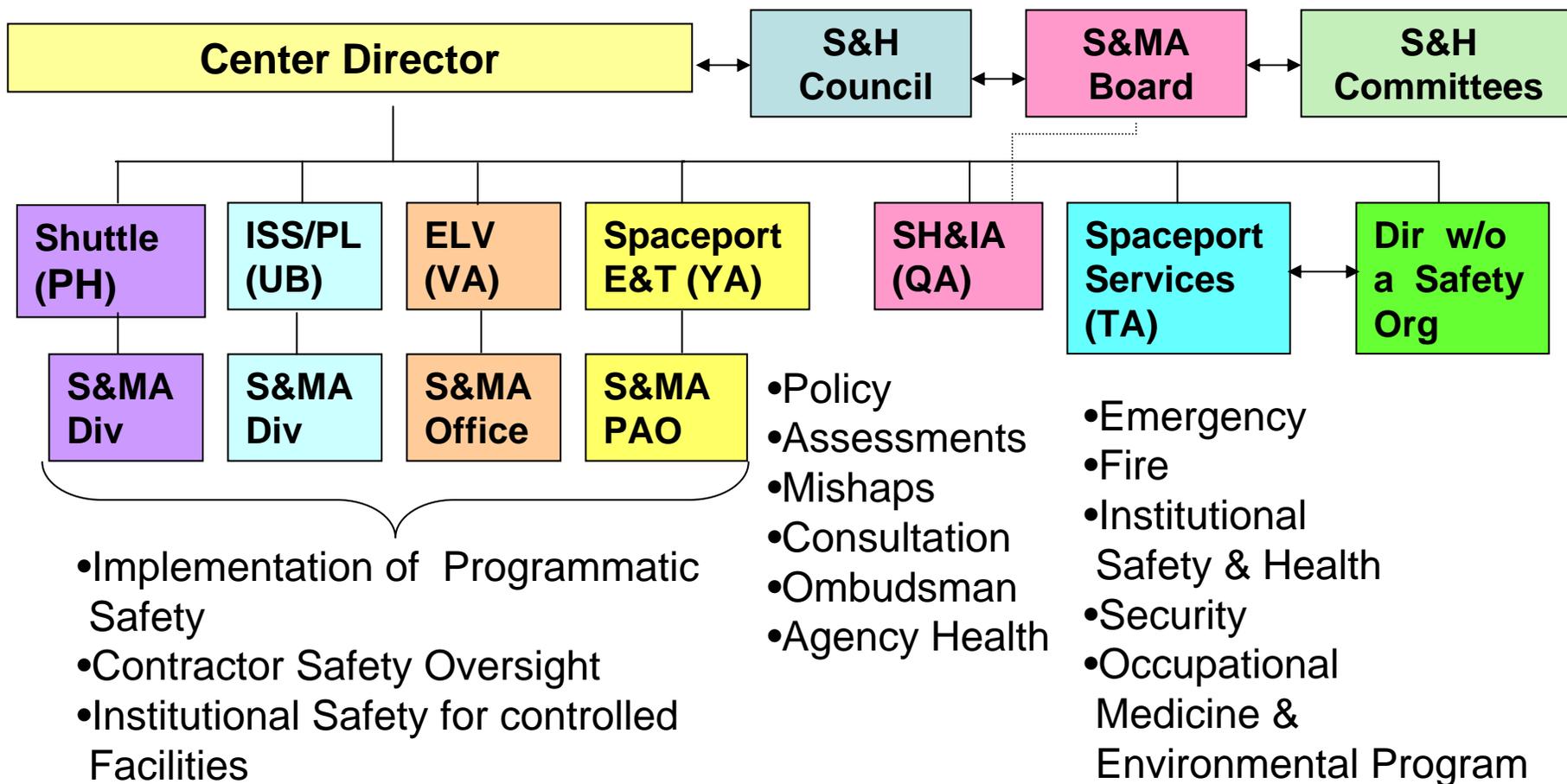
Significant Mishaps Roofing Tar Fire

- On October 31, 2005, the KSC Fire Department received a report of a small fire in the north parking lot of OSB 1.
- They found and extinguished a small fire around tar roofing pellets placed on sheets of plywood, next to a tar kettle.
- Investigation found that the tar kettle operator from a had performed 4 skimming operations that day, placing all of the removed hot molten carbon into a single pile directly onto plywood sheeting.
- This material was left undisturbed after the last skimming operation until firefighters responded.
- It appears the pile of hot tar retained heat in the center of the pile and smoldered for several hours until the wood reached its ignition temperature and began to burn.



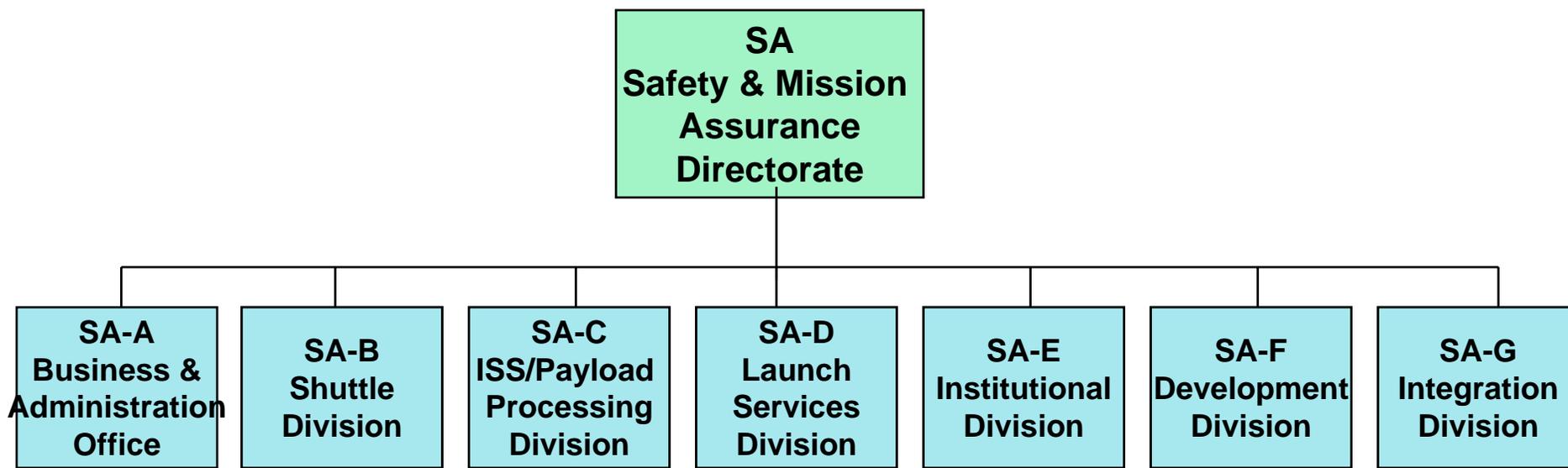


Significant Changes S&MA Reorganization - 2000



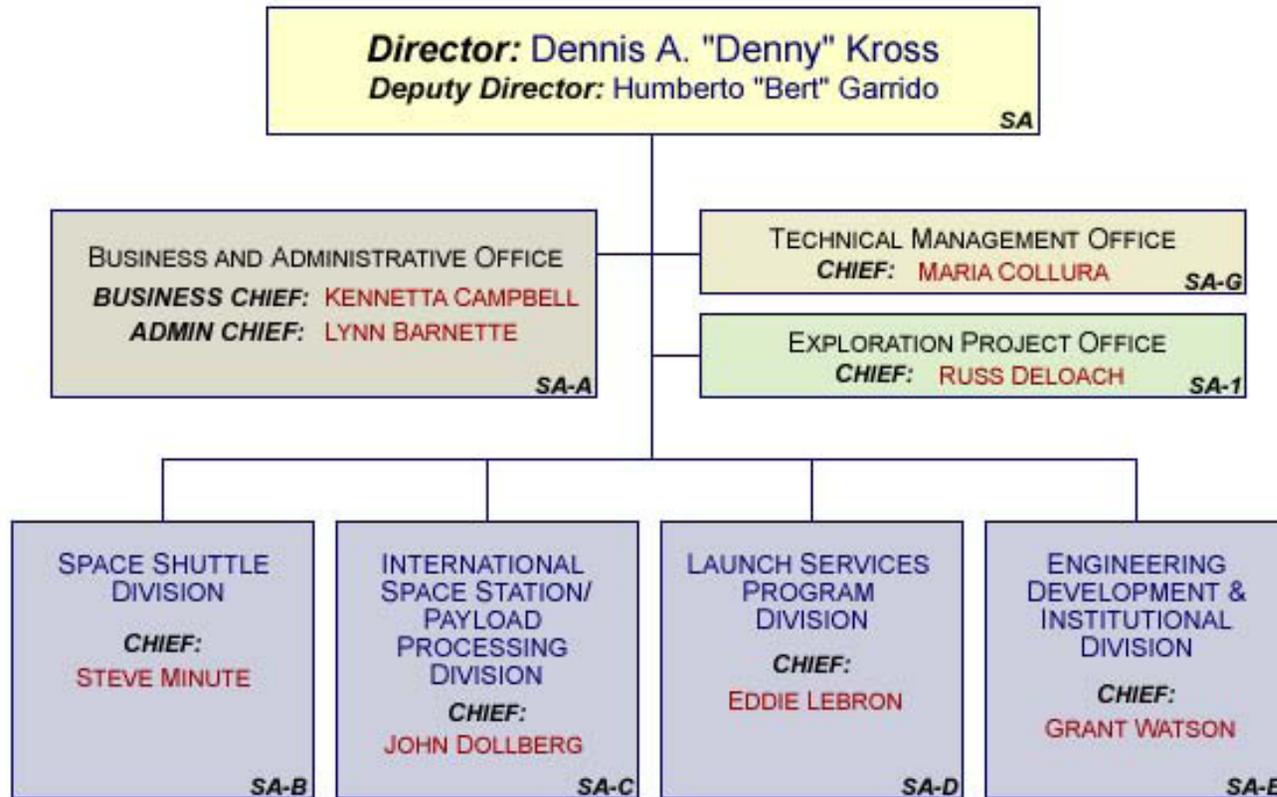


Significant Changes S&MA Reorganization - 2004





Significant Changes S&MA Reorganization - 2005





Significant Changes Safety and Health Organizational Focus

- KSC's annual safety and health day has been changed based on management's belief that the safety and health stand-down activity would be more effective if it were related to specific activities and operations within a given work area or work group.
- Each NASA organization will determine what approach will best add value to their work setting.
- The approach selected should allow for detailed discussions on safety and health as they pertain to the hazards faced by employees.
- The activities can be conducted at any organizational level.
- Directorate partnering with the contractors supporting their mission is encouraged.
- There is not a specific day designated for this activity.
- The organizational stand down should be between 4 and 8 hours in total length.



Challenges

- **Constellation Program Support**
 - Safety support for design and construction of infrastructure
 - Explosive safety quantity distance requirements
- **Construction Safety**
 - Ongoing hurricane recovery work
 - Visitor Center modernization
- **IRIS**
 - Implementation of required changes
 - Contractor usage
- **Shuttle Return to Flight**
 - Certificate of Flight Readiness
- **Safety requirements for Researchers**
 - Students
 - Non-NASA Research Activities



Mission Success Starts With Safety

Initiatives Fall Protection Survey



Initiatives

Fall Protection Survey

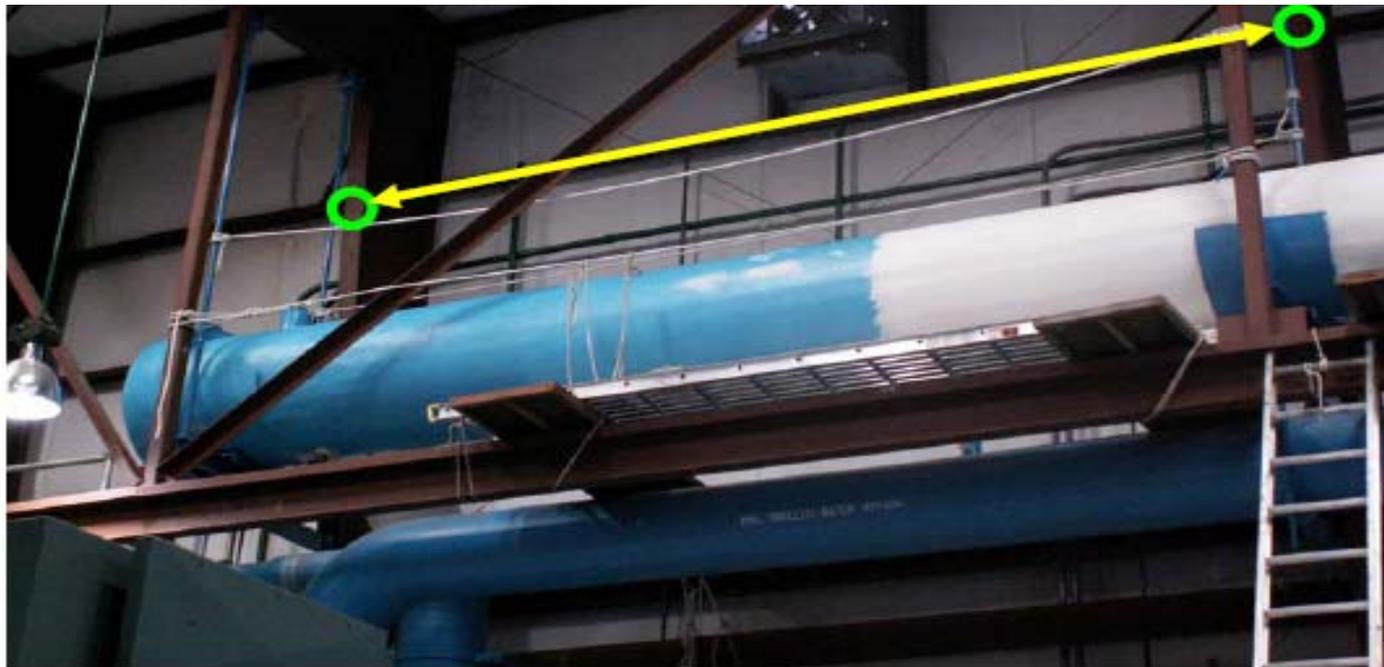
- KSC contracted with Gravitec Systems, Inc. to conduct a fall protection survey of KSC facilities.
- The survey was funded by the NASA HQ Office of Safety and Mission Assurance.
- The survey goals included:
 - Standardize Center fall protection programs to the greatest extent possible.
 - Abate fall hazards across the center.
 - Identify existing facilities requiring retrofit of fall protection systems.
 - Establish a baseline of the status of the current fall protection methods and benchmark KSC against the fall protection industry.
 - Develop a NASA KSC Policy.



Initiatives Fall Protection Survey

Survey Results

- Over 400 locations on KSC were visited
- 338 Fall Hazards documented.
- 235 Permanent Solutions
- Permanent Solutions were recommended for 70% of hazards visited.
- No changes were recommended for 25 locations (7%).
- Temporary solutions recommended for 78 locations (23%).



Re-Insulating Chilled Water

Relative Risk Rating = 5.1

Frequency:	F = 0.9: Occasionally	▼	Worker(s) at the location once every 2 to 10 years
Occurrence:	O = 1.0: Unique	▼	Hazard occurs at only one location.
Proximity:	X = 1.2: Very Close	▼	Worker(s) from 1 to 3 feet (0.3 to 0.9 m) of an improperly guarded fall hazard
Duration:	D = 1.3: Long	▼	Worker(s) at the location from 8 to 40 man-hours per occurrence, on average
Interference:	I = 1.1: Dependent	▼	Two workers on the same work platform
Security:	C = 1.0: Fair	▼	Not designed for walk & work or outdoor / worker can still navigate relatively easily
Environment:	E = 1.1: Variable	▼	Uncontrolled variables or weather, may compromise worker comfort & stability
Probability:	P = 1.7: Possible	▼	An accident is unlikely, but the possibility should be addressed
Protection:	T = 0.75: Poor	▼	Protection needs improvement. Not life threatening. Swing fall, compatibility, etc.
Severity:	S = 4.0: Critical	▼	>16 to 30 ft: Likely to cause critical injury, permanent or temporary disability, or death

Hazard Description

Relative Risk Rating = 5.1

Medium Risk Hazard

Task:

Workers remove damaged areas of insulation on the chilled water pipe. New insulation is painted after installation is installed.

Hazard:

Fall hazards are encountered while using the portable ladder for access and while standing on the pick board of approximately 25'. There is a rope tied between the structural red steel and the blue support hangar for the water pipe acting as a horizontal lifeline. This horizontal lifeline is suspect as it has not been designed and installed by a qualified fall protection person. There have been no design considerations for this lifeline.

Current Approach:

A 6 ft energy absorbing lanyard is connected to the horizontal lifeline rope once the worker reaches the pick board.

Special Considerations:

Horizontal Lifeline / Portable Ladder

Hazard Abatement

Conceptual Solutions:

1. Solution: Temporary Horizontal Lifeline: A commercially available temporary horizontal lifeline (yellow arrow) can be installed between the structural steel supports (green circles). These horizontal lifelines have been engineered and tested to work with ANSI approved lanyards and self-retracting lifelines. Users of the system can be assured that it will perform as tested, unlike rope that is strung between two points not supported by engineering.

2. Solution: Anchor Strap w/ Self-Retracting Lifeline: To protect the portable ladder, an anchor strap can be wrapped around the vertical support above the ladder to which a 30' cable self-retracting lifeline can be anchored. A tagline is used for workers on the ground to retrieve the self-retracting lifeline snap hook. The self-retracting lifeline will protect workers climbing the ladder. Upon reaching the pick board, workers can transfer to the horizontal lifeline and lanyard before disconnecting the self-retracting lifeline.

Rescue: A Pulley Rescue can be used to raise, disconnect, and lower a worker suspended from a horizontal lifeline to the ground.

Estimate	Hours	Quantity	Rate	Total
Engineering	0		\$0.00	\$0.00
Supply			\$1,580.00	\$1,580.00
Installation	0		\$0.00	\$0.00
Total	\$ 1,580.00	Plus NASA Multiplier		\$2,370.00

Remarks: This location is rarely accessed, so a permanent platform is not the preferred solution. OSHA requires that horizontal lifelines be designed as a complete fall arrest system (all components, including end anchors, connectors and fall arrest subsystem) that maintains a factor of safety of 2:1. (See Section 11 - Special Considerations)



Initiatives Fall Protection Survey

- **Follow on actions**
 - **Creation of fall protection working group**
 - **Development of Center policy**
 - **Prioritization of identified hazards and implementation of corrective action**
 - **Development of Center fall protection design standard**
 - **Development and implementation of improved training**



Initiatives

Safety and Health Cooperative Committee

- **The KSC Occupational Safety and Health Cooperative Committee exists to improve safety and health for KSC employees and visitors through:**
 - **Improving cooperation and communication across NASA/contractual lines**
 - **Standardizing and streamlining NASA and Contractor safety and health requirements, programs, processes, where possible**
 - **Identifying, prioritizing and addressing center-wide occupational safety and health issues**
 - **Sharing of program information, best practices and lessons learned**



Initiatives

Safety and Health Cooperative Committee

- **Membership**
 - Representatives from each resident contractor, each NASA S&MA Division and the NASA Occupational Health Branch
 - Members must have authority to make decisions
 - Participation by each organization is voluntary
- **Leadership**
 - Chaired by NASA Institutional Safety
 - Co-Chair rotated through contractor representatives
 - Reporting directly to the KSC Safety and Health Council