NASA TEERMM Project

Corn Based Blast Media
Technology Evaluation for Environmental Risk Mitigation
Principal Center

Program Manager: Chuck Griffin

May 12, 2009
What is NASA TEERM?

- The Technology Evaluation for Environmental Risk Mitigation Principal Center (TEERM)
- Identifies and validates sustainable pollution prevention technologies through joint activities
- Reduces risk while minimizing duplication and associated costs.
- Commonly involves two or more NASA stakeholders
- Collaborative approach benefits project members in multiple ways:
  - Resources are shared
  - Increases technical confidence
  - Improves the overall technical quality
  - Accelerates implementation
TEERM Partners

NASA:
• Shuttle Environmental Assurance (SEA) Initiative
• Constellation Program
• KSC Corrosion Laboratory
• Regulatory Risk Analysis and Communication (RRAC) Principal Center
  – Benefits through identification of future risks to mission.
• Recycling and Affirmative Procurement (RAP Principal Center
• DOD (JG-PP, AF Space Command)
• International (C3P, ESA)
NASA Refurbishment Activities

- Coatings removal is a necessary part of the maintenance, repair, and overhaul activities at many NASA centers and contractor support sites.

- Sensitive substrates, such as composites and thin aluminum alloys require special handling such as the use of chemical stripping, pneumatic hand sanding, or softer blast media.

- Type V, acrylic based PMB is commonly used to de-coat, strip, or de-paint the delicate substrates of the Solid Rocket Boosters (SRBs) currently used in support of the Shuttle and slated to be used in support of CxP.

- Strict quality control.
Plastic Media Blasting (PMB)

Advantages:
- Used primarily for de-coating processes which include delicate/sensitive materials (alloys, composites, etc)

Disadvantages:
- Derived from petroleum.
- Combustible!
- Visual inspection concerns
- Utilizes impact energy alone to remove coatings
- Consistent quality?
Corn Hybrid Polymer blast media (CHP)

Advantages:
- A “manufactured”, “extruded” product – quality control
- Compatibility with all commercially available plastic media blast systems
- Moisture resistance
- Longer product life
- UV fluorescence aids inspection
- Effective on composite materials and most metallic surfaces, meets MIL-P-85891
- Improved environmental and worker safety, non combustible

Disadvantages:
- Not readily known
Project Goals

- Qualify and Validate corn hybrid polymer with interested stakeholders.
- Implementation at NASA Centers and at NASA Contractor facilities.
Partner Description

Current Potential Stakeholders:

- NASA
- KSC, MSFC
- C3P
- USA
- ATK Thiokol
- ADM
- Midvale Technologies
CHP Benefits Summary

- CHP eliminates risks associated with environmental, safety, and health concerns regarding the use of sanding and chemical coating removal.

- Reduces costs by lasting longer and requiring less frequent blast booth filter change outs.

- Potential for process elimination regarding the current post-blast chemical wipe-down procedures (source 2008 Battelle assessment)
CHP Benefits Summary Cont.

Meets Section 9002 of the Food, Conservation, and Energy Act of 2008, otherwise known as the 2008 Farm Bill (Public Law 110-234) (source: USDA BioPreferred Prog)

- Leverage DoD studies thus reducing duplication of effort and costs.

- Potential for improved visual inspection process, resulting in minimized risk to mission

- Process affords a high degree of control when needed.
Questions?
BACK UP SLIDES


Solid Rocket Booster (SRB) refurbishment

The boosters (with aft skirts still attached), frustums, and parachutes are recovered by two SRB retrieval ships: the Liberty Star and Freedom Star.

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NASA TEERM CBBM Project
KSC Corrosion Control Facility

The frustrum, aft and forward skirts, and the ETA ring is processed using PMB at the CCF at Ransom Road.
KSC Corrosion Control Facility

SRB Aft Skirt after media blasting at the CCF.

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Image from ITB Inc.
The nozzles and the spent SRB case segments are shipped via rail to ATK Thiokol.
ATK Thiokol, Clearfield Utah

Refurbishment of the SRB motor segments is performed at ATK's Utah location.
A Need Within NASA

There is a need within NASA to:

- care for our environment, while meeting exacting standards
- meet Federal requirements
- find potentials for process improvements and cost benefits
- implement processes which do not require new training or extensive equipment changes.
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