USAMP/Non-Destructive Evalution Steering Committee (Task Team)

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This presentation does not contain any proprietary or confidential information

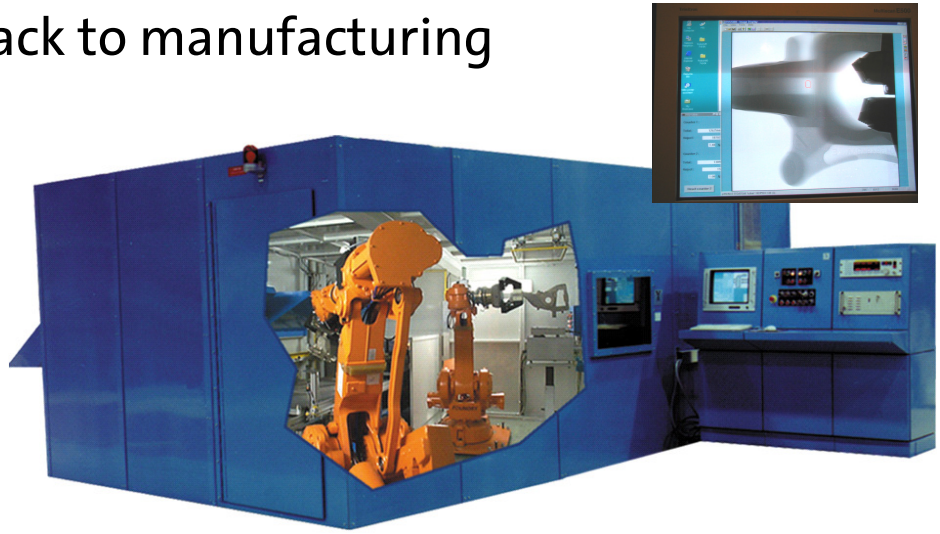
Outline

- Purpose of work
- Barriers
- Approach
- Performance Measures and Accomplishments
- Technology Transfer
- Publications/Patents
- Plans for Next Fiscal Year
- Summary

Purpose of Work/Barriers

By improved nondestructive testing

- Decrease vehicle mass by enabling new materials and joining methods
- Increase reliability of new, light-weight materials
- Decrease cost of expensive, new materials
  - Accelerated pre-production testing
  - Accelerated ramp-up to full production
  - Less scrap in production – feedback to manufacturing



In-line 100% radiography

Approach

- Launch new projects that aid high value activities
  - Light-weight materials, e.g. Al, Mg, composites
    - Both castings/forgings and sheet material
  - New, more efficient joining methods, especially for light-weight materials (adhesive bonding, laser welding, friction stir welding, riveting)
  - Limited USAMP budget ($560K/yr)

- Collaborate on projects with material & joining groups
  - ACC composite projects (both materials and joining)
  - AMD Mg projects (sheet, casting, and joining)
  - MTT (joining)

Accomplishments - historical

- ❑ Authorized as a "Task Team" by USAMP SC to develop projects 2006
  - 2006 NDE Strategic Plan
  - 2006 NDE601 Adhesive inspection
- ❑ NDE SC Endorsed by USAMP SC in 2004
  - Single POC identified for national lab NDE
  - 2004-6 AMD403 Laser lap-weld inspection
  - 2004-7 AMD409 RSW phased array
- ❑ First organized activity
  - 2001-2004 Resistance spot weld (RSW) inspection (MTT)

USCAR NDE Strategic Plan – Feb. 2007

UNITED STATES AUTOMOTIVE MATERIALS PARTNERSHIP

A Consortium of the United States Council for Automotive Research
Nondestructive Evaluation Steering Committee

Strategic Plan for Nondestructive Evaluation Development in the North American Automotive Industry

September 6, 2006

United States Automotive Materials Partnership,
A Consortium of the United States Council for Automotive Research
1000 Town Center Building, Suite 300
Southfield, MI 48075

- ❑ Expanding role of NDE
  - NDE for light-weighting
  - NDE for manufacturing
  - Emerging challenges
- ❑ Hurdles to greater use of NDE
- ❑ Gap analysis
- ❑ Guidelines for NDE development in the automotive industry

Available:
www.uscar.org

Hurdles to Greater Use of NDE

- **The Realities of the Plant Environment**
  - Can not interfere with production
  - Plants do not have time to analyze data: data collection and synthesis must be built in
- **Variability and Human Factors**
  - Must be measured and factored in
- **The Need for Standards**
  - Standardized procedures, validated performance
- **Cultural Barriers and the Inertia of the Status Quo**

Accomplishments in 2007

- NDE601 “Non-Destructive Inspection of Adhesive Bonds in Metal-Metal Joints “, with SNL (Apr./Aug. 2006)
- NDE701 “Enhanced Resonance Inspection for Light Metal Castings “, with PNNL (Jan./June 2007)
- ACC FP4 subtask, “Non-destructive Inspection for Manufacturing and Impact Damage of Composites”

Technology Transfer

- Projects built on 3(4)-legged participation
  - OEM (and often DOE) NDE experts
  - NDE vendors
  - OEM and supplier experts for material/joining method
- Plant try-out is intrinsic step in project
  - Feedback on plant processes & culture
  - Target for manufacturing inspection

Publications/reports

- NDE Strategic Plan (USCAR website)
- C.J. Dasch, ""What's Driving NDE in the Auto Industry?", Keynote address at ASNT Automotive Topical Conference, Dearborn MI, 16 May 2007
- C.J. Dasch, "Automotive Lightweight Materials: the Roles of NDE in Bringing New Materials into Production", Plenary Lecture at QNDE Conference, Golden CO, 23 July 2007.

Plans for Next Fiscal Year

- Current project oversight
- New collaborative efforts
  - AMD604, Task 1.8 “Adhesive and riv-bonding of Mg”
- New projects depending on new available funding
  - “Detection of Tears in Stamped Sheet Metal Components”, tabled proposal awaiting funding (Jan.-May 2007)
  - “Nondestructive Evaluation of Friction-Stir and Resistance Spot Welds in Aluminum”

Summary

- NDE is an important cost and reliability enabler of light-weight materials
- Many materials and processes would benefit from nondestructive testing
- Targeted activities across the full range of new materials and joining methods