Agenda

» Necessary Material Changes
  – ATD Materials which become unavailable
  – WorldSID parts requiring change
  – Action plans
Materials are becoming unavailable: Why?

– Environmental reasons
  ▶ Raw materials are banned (EPA, etc...) or undesirable to use
  ▶ This will continue to be more common in coming years
  ▶ Effects all ATD’s

– Economic Reasons
  ▶ Suppliers no longer will supply, change of ownership, no longer profitable for them to produce
Example of an ATD Materials which has become unavailable from current supplier

- Damping material used on most steel ribs
  - SAE committee is working on how to validate new materials
- Ureol
  - Plastic used in many dummies
    - ES-1, ES-2, ES-2re
      - Iliac wings, cord holders, shoulders
    - Q dummy family
      - ribs, bones, skull
    - Worldsid-50 & -5
      - Iliac wings, skull
Other reasons why an ATD Materials may become unavailable

► Likely candidates for future problems
  – Lead and lead based ballasts
  – Urethanes
    ▶ Mercury catalysts
    ▶ Other ingredients
  – PVC vinyl skins
    ▶ Phthalates
    ▶ Metals

► Over the coming years it is likely some materials will become unavailable
WorldSID Parts Requiring Change

- WorldSID-50
  - Iliac wings
  - Skull
- WorldSID-5
  - Iliac wings
  - Skull
ILIAC WING MATERIAL CHANGE
Iliac Wing Material Change

► Problem
  – Ureol material no longer available
  – Will run out in coming months

► Action plan
  – Design & build new mold
  – Develop equivalent material
    ▶ Develop process with new material
    ▶ Match Ureol at material sample level
    ▶ Static & Dynamic component level tests
  – Final verifications
    ▶ Dummy certification tests
    ▶ Dummy pendulum biofidelity tests
    ▶ WorldSID task group trials
Design & build new mold

► Left side mold complete
Develop process with new material

► Started trials with thermoset
Match Ureol at material sample level

► Make material samples for quasi-static and dynamic material sample testing

Quasi-static 3-point bending

Dynamic Impact & Durability Testing
Static & Component level tests

► Components
  – Ureol iliacs
  – Thermoset iliacs

► Stiffness Tests
  – Quasi-static
  – Dynamic drop tower

► Fixture is almost complete
Final Verification

► Certification Tests
  – Run 5 sets of new iliacs in lab dummy to verify compliance to corridors

► Pendulum biofidelity tests
  – Several iliacs
  – 3 velocities

► Provide several iliacs to WorldSID task group for trials
5TH ILIAC MATERIAL CHANGE
5th Iliac Material Change Plan

► Same Ureol blend as 50th

► Plan

– Complete 50th work

– Use same process and thermoset material blend as for 50th

– Run certification tests with 3 iliac pairs to verify blend

– Run pendulum biofidelity tests

– Make parts available to customers to try
Example of work so far for same replacement on Q & Worldsid dummies

Benchmark material Ureol 100

Candidate replacement: Rencast 6444

Methodology:
- Resonance
- Dynamic: Frontal and lateral head drop test
- Durability: Head drop test

Observation in Q10
- Rencast 6444 appears to have no resonance below 10KHz
- The part made from Rencast 6444 met cert corridor
- Barium sulfate was used to ballast the head, need more investigation to compensate weight