

Multi-Materials Vehicle R&D Initiative

Project ID “LM009”

MMV 701

2010 DOE Merit Review Presentation

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Overview

Timeline

- Start: Oct. 1, 2007
- End: Sept. 30, 2010
- 90% complete

Budget

- Total project funding thru 3/31/10
 - DOE: \$285.4K
 - USAMP: \$218.2 K
- Funding received in FY09: \$137.4 K
- Funding for FY10: \$144.4 K
(Project ends FY10)

Barriers/targets

- Cost-competitiveness of lightweighting solutions for high volume manufacturing
- Lack of adequate materials, process, performance and business case information in OEM vehicle engineering
- Lack of flexible joining technologies and infrastructure for dissimilar materials

Partners

- **OEMs:** Chrysler, Ford, GM
- **CAE Archive:** Multimatic
- **Technical Cost Modeling:**
Camanoe Associates
- **Powertrain & Weight Matching:** FEV

Relevance

- Overall Objectives
 - Developing Lightweight Materials Technologies for Cost-Effective, Large-Scale Implementation in Vehicles That Meet Consumers' Needs While Providing Increased Fuel Efficiency.
- 2009 Objectives
 - Finalize oversight and close-out of three “Seed Projects” to baseline MMV vehicle, including:
 - Developing and sharing baseline vehicle technical cost information
 - Maintain baseline vehicle CAE and weight information
 - Kick off MMV 903 “L7” Lightweight 7+ Passenger Vehicle R&D Project Phase 1: Powertrain Benchmarking and Simulation to determine actual weight reduction requirements to achieve 34+ mpg for a minivan with a state-of-the-art 4-cylinder engine (145-185HP) and transmission combined with state-of-the-art aerodynamics, tire rolling resistance, electric power steering, etc. and to achieve 31 mpg for a higher performance CUV with a state-of-the-art engine producing (~200-250HP) and otherwise configured similarly to the minivan vehicle.

FY2009 Milestones

- Completed baseline vehicle technical cost model
- Completed providing durability, crash performance, etc., from baseline vehicle to all three seed projects
- Kicked off MMV903 “L7” Project Phase 1

APPROACH

L7 Phase 1 began with identification of benchmark current production powertrains to use for simulation purposes to identify required weight reduction targets. Simulations have been ongoing since that time to ascertain appropriate weight reduction targets.

FY2009 Accomplishments

MMV accomplishments primarily surround initiating efforts and continuing support and alignment of the three USAMP body subassembly projects.

- Helped Seed projects teams complete the donor vehicle systems-level manufacturing and assembly baseline cost modeling project.
- Continued to guarantee alignment between all three Seed projects on engineering performance metrics.
- Initiated MMV903 Lightweight 7+ Passenger Vehicle Study (L7) with the goals of; developing a generic lightweight 7+ passenger vehicle concept to demonstrate application of mixed material technologies and mass compounding towards the creation of a lightweight, cost effective vehicle to achieve at least a 40% increase in EPA combined fuel economy with no sacrifice in safety, comfort, features, utility, or performance. Phase 1 of the project was approved by the USAMP Steering Committee and is currently in the early stage of execution.

Work for FY2010

1. The MMV R&D initiative will continue to help close out the three USAMP MMV “Seed” projects, and remain opportunistic in attracting new project ideas from USAMP in areas such as multi-material joining technologies.
 - Archive CAD and FEA information from FGPC and MFEDD
 - Summary weight saving and costs relative to baseline vehicle
2. MMV will complete Phase 1 of the L7 project (MMV 903) in the second quarter of CY 2010, the powertrain and weight matching for fuel economy and performance, present the results to the USAMP Steering Committee and determine with the Committee whether further work in this area is warranted. Future efforts would be conducted under the auspices of other USAMP groups, i.e., AMD, ACC, A/SP or NDE.
3. MMV will complete all efforts and reports by mid September 2010 so that the project can be closed in FY2010.

Summary

- MMV701 completed all project deliverables
- There are no plans to continue on with the project MMV 903 once the final report is completed on L7 Phase 1.