Project Code and Title

B.02.02.03 Upgrade Side Crash Protection

Project Objective

To improve occupant protection in side impact crashes for passenger cars and light trucks and vans (LTVs) in both vehicle and fixed objects impacts. To provide the research foundation for a follow-on regulatory action to FMVSS 214 for higher severity side impact performance testing and a second generation of side impact dummies.

Background

The dynamic FMVSS 214 for passenger cars, October 1990, established minimum requirements for thoracic and pelvic protection for near-side occupant intersection type car to car side crashes. Partial compliance with this federal motor vehicle safety standard began in 1994 and full compliance by all passenger cars is required by 1998. Dynamic FMVSS 214 was extended to include LTVs in 1995, with full compliance required by the year 1999. The NHTSA Statement of Research Needs for the mid-1990's recommended that the agency explore the feasibility of requiring higher severity side impact protection. Moreover, The NHTSA Strategic Execution plan, June 1996, outlined the goal of “assessing whether it is feasible to upgrade the side impact safety standard to, for example, include narrow object collisions.” With the near term side thorax and pelvic impact research complete, this project will continue to define the remaining safety problem, with emphasis on fixed objects side impact, will develop advanced test procedures, assess the safety benefits from the full implementation of FMVSS 214, and study advanced countermeasures in both the analytical and testing areas as part of NHTSA's advanced side impact research.

Problem Definition

Side impact accidents of light vehicles, i.e. passenger cars and light trucks and vans (LTVs), result in around 9,300 fatalities and over 890,000 injuries each year (1994 FARS and GES). This corresponds to about 30% of vehicles involved in tow away crashes. Even after full implementation of dynamic FMVSS 214, the remaining safety problem is considerable, in particular in side crashed with fixed objects and in higher speed vehicle to vehicle side crashes.

Research Approach

This project will investigate improved side crash protection. The research approach involves accident analyses to establish a better understanding of side impact conditions and in due time evaluate effectiveness of FMVSS 214. It also involves support to the agency in developing a side impact New Car Assessment (NCAP) program, development of advanced analytical models of vehicle and dummy systems, development of a higher severity test procedure, analytical modeling and crash testing to determine baseline fleet performance and the effectiveness of advanced countermeasures, development of advanced instrumentation test devices, and coordinating with industry on an advanced side impact dummy and alternate side impact injury measures. Tasks 1 through 14 are currently identified under this project

Potential Impact/Application

The proposed research will address several potential upgrades to FMVSS 214 as a follow-on to the new passenger car dynamic side impact test issued in October 1990 for passenger cars, and extended in 1995 to LTVs.

Key Milestones

- Pole Impact Test Procedure, 1998
- Pole Impact Baseline Fleet and Countermeasure Testing, 1999

RESOURCE REQUIREMENTS	FY 96	FY 97	FY 98	FY 99	FY
Contract Money ($K)	140	600	600	600	

Project Manager(s)

Randa Radwan Samaha (202) 366-4707, Randa.Samaha@nhtsa.dot.gov

Completion Date

TBD - dependent on problem definition

Keywords: side impact, finite element modeling, pole impact, side air bags

Project Tasks

Task	**Title and Description**
Task 1	Update Problem Definition
Task2	Narrow Object Side Impact Accident Analyses
Task 3	NCAP Test Procedure Development Support
Task 4	Finite Element Model (FEM) of the SID
Task 5	FEM Models of Baseline Vehicles
Task 6	FEM Model of Movable Deformable Barrier (MDB)
Task 7	Advanced Instrumentation MDB Design and Testing
Task 8	Rigid Body Modeling Studies (FMVSS 214 & Pole Impacts)
Task 9	Modeling Studies to Evaluate Side Air Bag System Effectiveness
Task 10	Advanced Side Impact Dummy Evaluation
Task 11	Pole Impact Test Procedure
Task 12	Pole Impact Baseline Crash Testing and Countermeasure Studies for PCs and LTVs
Task 13	Analytical Countermeasure Studies for Pole Impacts
Task 14	Perform Accident Analyses to Study Effectiveness of FMVSS 214

Task	Start Date	Projected Completion Date	Status/Responsibility
1	6/94	9/95	Preliminary study complete, but ongoing requirement
2	6/94	9/97	Initial study complete 9/95: update study ongoing; hardcopy analysis planned
3	TBD		Pending Congressional provision of funding for a side NCAP program
4	5/94	6/97	Basic FEM developed; refining lower extremities, additional material testing and overall model validation in sled and full vehicle crash test is planned starting 10/96
5	5/94	ongoing	FEM of midsize PC structure developed 5/95; Incorporating interior & dummy, validation in angled test & pole impacts expected 12/97; FEM of small PC planned; FEM of pickup under development
6		ongoing	FEM of MDB developed and refined; additional validation against angled and flat wall test at different speeds is planned
7	5/95	10/97	in progress
8	1/94	ongoing	Models of LTVs and a PC in FMVSS 214 impct developed; Pole Impact model in progress
9	1/97	TBD	
10	TBD		Awaiting availability
11	1/97	12/97	
12	1/98	12/99	
13	1/98	12/99	
14	1/98	TBD	Initial phase planned