

# REDEPLOYABLE FORCE-LIMITING SEAT BELTS FOR OCCUPANT CRASH PROTECTION

Fall Semester 2006  
TR 12:30pm-1:45pm, Randolph 129

## Introduction:

One of the unintended consequences of seat belts in a crash are rib fractures from the belt loading. Rib fractures are most common for occupants with fragile skeletons, e.g., the elderly or women with osteoporosis. To combat this injury risk, some newer model cars are now being equipped with force-limiting seat belts – a very clever enhancement to standard seat belts which caps the force transmitted to the thorax in a crash. Force-limiting belts have the one drawback however that they can only deploy once, and are hence ineffective in a multiple impact crash. This class will present the biomechanics of thoracic injury and the techniques for occupant restraint design.

## Objective:

The objective of this project is to design, build, and test an advanced force-limiting seat belt system which can redeploy after each impact in a multi-impact crash. Tasks will include:

- (1) Reverse engineering of current force-limiting seat belt systems
- (2) Evaluation of competing force-limiting designs in bench-scale tests
- (3) Design and testing of an advanced force-limiting belt system
- (4) Reporting

## Instructor:

Professor H. Clay Gabler  
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## COURSE ORGANIZATION and GRADING SYSTEM

1. Course Coordinator assessment (Dr. Terpenney)		15%
	Attending her lectures, her quizzes etc	
2. Faculty advisor assessment (Dr. Gabler)		35%
	Quizzes, assignments from Dr. Gabler	
3. Midterm Deliverable (presentation and report)		
	Presentation (Dr. Gabler)	10%
	Report (Dr. Gabler)	10%
	Report (Dr. Terpenney)	5%
4. End-of-term Deliverable (presentation and report)		
	Presentation (Dr. Gabler)	10%
	Report (Dr. Gabler)	10%
	Report (Dr. Terpenney)	5%

**Total:** 100% (Dr. Gabler = 75%, Dr. Terpenney 25%)

Grades will be based most likely on the following scale; however, the instructor reserves the right to curve the grades up or down based on the overall class performance:

92 +	A;	90 – 92	A-;	88 – 90	B+;	82 – 88	B;	80 – 82	B-;
78 – 80	C+;	72 – 78	C;	70 – 72	C-;	68 – 70	D+;	62 – 68	D
60 – 62	D-;	0 – 60	F						

### COURSE POLICY:

- Attendance at all classes is mandatory.
- No late assignments will be accepted.
- Extra credit: Attending a guest lecture (outside of class time) and asking a question. We will have these periodically throughout the semester.