Fundamentals of Crash Sensing in Automotive Air Bag Systems

List of Chapters

Foreword

Chapter 1 History and Background
  1.1 A Historical Perspective
  1.2 Accident Statistics: Are Air Bags Effective?
  1.3 How Do Air Bags Work?
  1.4 Design Issues and Considerations
  1.5 Recent Developments
  1.6 Summary
  Exercises
  References

Chapter 2 Crash Analysis
  2.1 Crash Data
  2.2 Crash Analysis: What Information Can Be Extracted from Crash Data?
  2.3 Crash Data Examples
  2.4 Observations and Discussions about Crash Data
  2.5 Crash Library for Sensor Design
  2.6 Summary
  References

Chapter 3 Crash Sensing Criteria
  3.1 Threshold of Collision Severity: When is an Air Bag Deployment Needed?
  3.2 Rule of 5 Inches Minus 30 Milliseconds and Sensor Triggering Time
  3.3 Occupant Performance Criterion
  3.4 Crash Sensing Characteristics
  3.5 Summary
  References

Chapter 4 Crash Sensing Concepts
  4.1 Signals for Crash Detection
  4.2 Speed-Dependent Crash Sensing
  4.3 Crush-Dependent Crash Sensing
  4.4 Electronic Sensors
  4.5 Other Sensor Concepts and Systems
  4.6 Summary
  References

Chapter 5 Mechanical Crash Sensors
  5.1 Exemplar Crash Sensors
  5.2 Mathematical Analysis of Mechanical Crash Sensors
  5.3 Sensor Sensitivity and Characteristics
  5.4 Sensor Testing
  5.5 Summary
  References

Chapter 6 Electronic Crash Sensors
  6.1 What Are Electronic Crash Sensors and Why Are They Used?
  6.2 Functions and Components of Electronic Crash Sensors
  6.3 Sensing Algorithms in Electronic Sensors
  6.4 Signals and Variables in Sensing Algorithms
  6.5 Summary
  References

Chapter 7 Crash Sensor Placement Strategies
  7.1 Distributed Sensing and Single-Point Sensing
  7.2 All-Mechanical Air Bag Systems
  7.3 Single-Point Sensing Concept and Electronic Sensors
  7.4 Summary
  Exercises
  References

Chapter 8 Side Impact Sensing and Air Bags
  8.1 Side Impact
  8.2 Kinematic Analysis of Side Impact
  8.3 Sensing Concepts and Examples
  8.4 Summary
  References

Chapter 9 Transitions and Trends in Crash Sensing Technologies and Automotive Restraint Systems
  9.1 Definition of a Smart Air Bag System
  9.2 Elements of Smart Air Bags
  9.3 Integrated Sensing System
  9.4 A Perspective of Complete Restraint System Design
  9.5 Summary
  Exercises
  References

Glossary
Bibliography
Index
About the Author