

# Safety Research Report Index - Utility Vehicle Rollover

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1. Opinion in Roy v. Volkswagen, \$3 million judgement in VW Van Rollover case, \_\_\_F.2d\_\_\_ (9th Cir.1990)
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1. NHTSA to GM, request for information on rollover propensity, 3/7/89
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13. Mitsubishi to NHTSA, reply to (undated) letter, 5/31/89

## D. MANUFACTURER REPORTS TO NHTSA ROLLOVER SUBCOMMITTEE

1. S. Yoshida, Toyota, "Presentation of an Idea of Evaluating Method for Vehicle Rollovers," March 1989
2. C. Winn, Chrysler, "Illustrations of Vehicle Rollover Mechanisms," presentation to NHTSA Rollover Subcommittee, 7/27/89
3. K. Drexler, Mercedes-Benz, "Automatic Rollover Bar Design for the new Mercedes-Benz Convertibles, NHTSA Rollover Subcommittee Presentation, 7/27/89
4. M. Honda, Nissan Motor Co., Rollover Subcommittee Presentation, 7/27/89

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1. "How the '76 Handling Standards Will Outlaw Unstable Cars," Popular Science, 8/1/72
2. "Utility Vehicles Found Hazardous on Highways: Rollover & Ejection Rates are High," Status Report, Insurance Institute for Highway Safety (IIHS), 5/6/80
3. "Warning Stickers Proposed for All New Utility Vehicles," Automotive News, 1/10/83
4. NHTSA Study Finds Three Utility Vehicles Most Dangerous," Status Report, IIHS, 1/18/83
5. "Auto Makers Suggest Warning Sticker Change," Status Report, IIHS, 3/1/83
6. "Small Utility Vehicles to be Required to Display Warning Labels," Status Report, IIHS, 6/23/84
7. "Study Confirms High Rollover Rate for Utility Vehicles," Status Report, IIHS, 9/22/84
8. "Study of Utility-Vehicle Rollovers Prompts Call for New Regulations," Automotive News, 7/14/86
9. "Study Shows Rollover Fatalities Closely Tied to Vehicles' Stability," Status Report, IIHS, 8/23/86
10. "Small Passenger Vehicles a Problem," Status Report, IIHS, 2/28/87

11. "Rollover Crashes Seen as Chief Safety Problem for Light Trucks," Status Report, IIHS, 6/27/87
12. "NHTSA Denies Petition on Rollover Standard," Status Report, IIHS, 1/30/88
13. "NHTSA Study Rebutts Stand On Rollovers," Automotive News, 4/25/88
14. "NHTSA Turns Down Petition Seeking Stability Ruling," Status Report, IIHS, 7/9/88
15. "Luken Announces Probe of Whether NHTSA Administrator Vetoed Staff Recommendation to Establish Safety Standards for Utility Vehicles," U.S. House, Subcommittee on Transportation, & Hazardous Materials, Press Release, 7/15/88
16. "Steed Ordered to Turn Over All Papers on Rollover Petition," Status Report, IIHS, 8/13/88
17. "Luken Probes NHTSA Administrator's Refusal to Tell Congress About Her Veto of Staff Recommendation to Establish Safety Standards of Utility Vehicles," Office of Congressman Tom Luken, Press Release, 10/26/88
18. "Government to Start Work on Rollover Standard," Consumer Reports, 11/88
19. "Quick Action Urged on Safety Standards for Multipurpose Vehicles," Status Report, IIHS, 6/17/89
20. "NHTSA expects to propose a rollover rule by spring," Automotive News, 1/14/91
21. "Auto Roll-Overs Are New Target of a US Push," New York Times, 1/14/92
22. "IIHS: Utility Vehicles, Light Trucks Prone to Fatal Rollovers," Highway & Vehicle Safety Report, 4/92
23. "Rollover Death Rates Alarming High: Ford Bronco II Worst," Status Report, 5/2/92
24. "The Utility Vehicle Rollover Case: Understanding the Defect," Trial Magazine, 6/92
25. "NHTSA Juggles Rollover Arguments," Automotive News, 7/6/92
26. "U.S. Seeks A Rollover Risk Rating," Washington Post, 6/24/94
27. "Big 3 See Rollover-Risk Stickers As Lesser Of 2 Evils" Automotive News, 6/27/94
28. "Why U.S. Rollover Tests Name No Names," San Jose Mercury News, 7/1/94
29. "Rollover Labels Aren't Enough; Prevent Rolling in the First Place, Safety Groups Advise," Status Report, 8/94.
30. "Feds Abandon Car Safety Measure," San Francisco Examiner, 10/2/94
31. "U.S. Says Rollover Rule Too Costly," Automotive News, 6/10/96
32. Articles from Center for Auto Safety newsletter, IMPACT (1978-96)

## H. EXPERTS

### I. MANUFACTURER ROLLOVER STUDIES

1. E. Moffatt, GM Engineering Staff, "Occupant Motion in Rollover Collisions," (circa 1970)
2. Ford Motor Co., "A Method for Determining the Center of Gravity & Moment of Inertia of an Automobile," (undated)
3. J. Habberstad, et. al., Ford Motor Co., "Rollover & Interior Kinematics Test Procedures Revisited," SAE Paper #861875 (excerpt), (1986)
4. R. Antoun, et. al., Ford Motor Co., "Vehicle Dynamic Handling Computer Simulation--Model Development, Correlation, & Application using ADAMS," SAE Paper #860574 (excerpt), 1986
5. P. Hackert, et. al., Ford Co., "Dynamic Simulation of Light Truck Handling Maneuvers Using " (excerpt), (circa 1986)
6. American Motors, "Methodological Problems in Measuring the Rollover Crash Risk," 12/86
7. R. Rasmussen, General Motors, "Rollover Resistance," 6/88
8. R.T. Bundorf & M.P. Holcomb (General Motors), K.F. Orłowski, E.A. Moffatt, "Reconstruction of Rollover Collisions," (circa 1988)

### J. STUDIES ON TESTING FOR ROLLOVER TENDENCY

1. Calspan Corporation, "Vehicle Rollover Test Procedure," DOT Rep. #HS 802-174, 1/77
2. SAE Recommended Practice, "Roll-over Tests Without Collision - SAE J857," 6/80
3. NHTSA & System Technology Inc., "User's Guide & Program Description for a Tripped Roll Over Vehicle Simulation," 7/87
4. University of Missouri, "Sensitivity Analysis of Vehicle Design Attributes that Affect Vehicle Response in Critical Accident Situations-PART I: User's Manual," DOT Rep. #HS 807-229 (excerpt), 12/87
5. University of Missouri, "Sensitivity Analysis of Vehicle Design Attributes that Affect Vehicle

Response in Critical Accident Situations--PART II; Technical Report," DOT Rep. #HS 807-230 (Appendices omitted), 12/87

6. University of Missouri, "Sensitivity Analysis of Vehicle Tripped Rollover Model," DOT Rep. #HS 807-300
7. A. Nalecz, "Intermediate Maneuver Induced Rollover Simulation (IMIRS) and Sensitivity Analysis," 9/89.
8. B.K. Kebschull, et al., NHTSA, "Rollover, Braking, & Dynamic Stability - Modified Suspension Vehicles," 8/90 (Appendices omitted)
9. NHTSA, "Technical Assessment Paper: Relationship Between Rollover & Vehicle Factors," 7/91 (Selected appendices); "Addendum to Technical Assessment Paper," 8/90
10. M. Monk, "Center of Gravity & Moments of Inertia Measurement Device," U.S. Patent # 5,177,998 (1/12/93)

## K. ROLLOVER STUDIES ON ACTUAL CRASH EXPERIENCE

1. P. Hight, Trauma Research Group, Univ. of California, "Injury Mechanisms in Rollover Collisions," 11/8/72
2. I.S. Jones, London University College, "Vehicle Stability Related to Frequency of Overturning for Different Models of Car," 1974
3. University of Michigan, Highway Safety Research Institute, "An Overview of the On-Road Crash Experience of Utility Vehicles (Highlights of the Technical Report)," 2/80
4. Motor Vehicle Manufacturers Association, Light Truck Accident Panel, "Comments on 'On-Road Crash Experience of Utility Vehicles,'" 11/80
5. D. Reinfurt, et. al., Highway Safety Research Center, Univ. of North Carolina, and IIHS, "A Comparison of the Crash Experience of Utility Vehicles, Pickup Trucks, & Passenger Cars," 9/81
6. S. Smith, National Center for Statistics & Analysis, "Analysis of Fatal Rollover Accidents in Utility Vehicles," DOT Rep. #HS 806 357, 2/82
7. H. Joksch, "Comments on the Paper, 'Rollover & Serious Driver Injury Differences Among Various Utility Vehicles, Pickup Trucks, and Passenger Car Groups'," Quarterly Journal, AAAM, 10/82
8. D. Reinfurt, Highway Safety Research Center, Univ. of North Carolina, "A Further Look at Utility Vehicle Rollovers," 8/84
9. L. Robertson & A.B. Kelley, "The Role of Stability in Rollover-Initiated Fatal Motor Vehicle Crashes under On-Road Driving Conditions," 5/86
10. E. Harwin & H. Brewer, NHTSA, "Analysis of the Relationship Between Vehicle Rollover Stability & Rollover Risk Using the NHTSA CARDfile Accident Database," (1987)
11. NHTSA, draft of "Preliminary Assessment of the Fatal Rollover Crash Experience of the Suzuki Samurai," (undated)
12. D. Cohen & K. Digges, NHTSA, "Rollover Crashworthiness Classification & Severity Indices," (1989)
13. L. Robertson, Nanlee Research, "Static Stability as a Predictor of Rollover Crashes Fatal to Occupants of Cars & Utility Vehicles," 5/87
14. K. Terhune, Franklin Research Center, Calspan, "A Study of Light Truck & Passenger Car Rollover & Ejection in Single-Vehicle Crashes," 5/88
15. L.M. Shaw, "Comparison of Vehicle Rollover & Ejection Propensity with Rollover Accident Statistics," 10/88
16. E. Harwin & L. Emery, NHTSA, "The Crash Avoidance Rollover Study: A Database for the Investigation of Single Vehicle Rollover Crashes," 5/89
17. Data Link & NHTSA, "Rollover in Motor Vehicle Accidents," (Appendix omitted), 7/89
18. P. Mengert, et. al., Transportation Systems Center, "Statistical Estimation of Rollover Risk," DOT Rep. #HS 807-446, 8/89
19. K.W. Terhune, Arvin/Calspan Inc., "A Study of Light Truck and Passenger Car Rollover & Ejection in Single Vehicle Crashes," (circa 1989)
20. D. Friedman, Liability Research Group, "Improved Product Design by Impact Testing of Human Subjects," 11/4/90.
21. D. Friedman, Liability Research Group, "Alternate Analysis of Rollover Head & Neck Injury Data," 4/17/91
22. D. Friedman, Liability Research Group, "Roof Collapse & the Risk of Severe Head & Neck Injury," 13th International Experimental Safety Vehicle Conference, 11/91.
23. S. Partyka, NHTSA, "Door Opening & Occupant Ejection through Rear Hatches, Tailgates, &

## **L. TECHNICAL REPORTS RELATING TO MEASURED/CALCULATED VEHICLES ROLLOVER PARAMETERS**

1. E. Horkey, "Large Tire Problem Analysis," (circa 1979)
2. NHTSA, "Occupant Motion During a Rollover Crash," DOT Rep. #HS 806 646, 11/84
3. NHTSA, "Center of Gravity & Track Width Data Gathered for Use in Evaluating the Wirth Petition," 4/87
4. R. Allen, Systems Technology, Inc., "Vehicle Characteristics and Maneuver Conditions Affecting Rollover," 8/88
5. W.R. Garrott, "Inertial Parameters of Selected 1988 Four Wheel Drive Utility Vehicles," (Appendix omitted), 9/88
6. NHTSA, "Inertia & Center of Gravity Data for Selected Cars, Utility Vehicles and Light Trucks," 10/21/88
7. W.R. Garrott, et. al., Vehicle Research & Test Center, "Vehicle Inertial Parameters Measured Values and Approximations," 10-11/88
8. D. Weir, Dynamic Research, Inc., "Rollover, Braking & Dynamic Stability - Modified Suspension Vehicles," (circa 1988)
9. C. Clark, et. al., NHTSA, "Rollover Crash & Laboratory Tests of Ejection Reduction by Glass-Plastic Side Windows & Windshields," 2/89
10. R. Allen, Systems Technology, Inc., "Vehicle Dynamic Stability & Rollover," 7/89
11. W.R. Garrott, NHTSA, "Rollover Research Activities at the Vehicle Research and Test Center
12. W.R. Garrott, "Tilt Table Data Used in NHTSA Analysis of Vehicle Rollover Stability," 4/2/93
13. NHTSA, "Tilt Table Ratio, Critical Sliding Velocity, & Michigan Rollovers per Single Vehicle
14. W.R. Garrott, "Center of Gravity Height Measurements for Selected Cars & Utility Vehicles," (undated)
15. NHTSA, Car & light truck inertial & dimensional data, including center of gravity, (undated)

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Accident

## **M. TESTS BY CONSUMER GROUPS**

1. "Warning: The Suzuki Rolls Over Too Easily," Tests of Jeep Wrangler, Jeep Cherokee, Isuzu Trooper and Suzuki Samurai, Consumer Reports, 7/88
2. Association for Consumer Research, London England, Tests of Suzuki Samurai & SJ 410, Daihatsu Fourtrak and Toyota Space Cruiser, 7/13/88
3. "Follow-up: Some Suzuki Rollovers," Consumer Reports, 8/88
4. "How Safe is the Ford Bronco II?" Tests of Geo Tracker, Dodge Raider, Chevrolet S-10 Blazer and Ford Bronco II, Consumer Reports, 6/89
5. "Consumer Reports Tests Reveal Rollover Hazard: 1995/96 Usuzu Trooper & 1996 Acura SLX 'Not Acceptable'" Consumers Union Press Release, 8/20/96

## **N. NHTSA AND GENERAL ACCOUNTING OFFICE REPORTS**

1. NHTSA Report to the Committees on Appropriations, "Light Truck & Van Safety," 5/87
2. NHTSA Pamphlet, "Consumer Information-Utility Vehicles," 10/87
3. NHTSA Report to the Committees on Appropriations, "Safety Programs for Light Trucks & Multipurpose Vehicles," 4/88
4. NHTSA Rollover Subcommittee member list, fatality data, rollover models, data sources, test procedures, research, 1988
5. NHTSA Report, "Safety Program For Light Trucks & Sport Utility Vehicles," 4/90
6. NHTSA Office of Standards Evaluation, "Effect of Car Size on the Frequency & Severity of Rollover Crashes," 5/90
7. GAO Report to Congressional Subcommittee On Transportation, "Fatalities in Light Trucks & Vans," 11/90
8. Index to NHTSA Public File 88-01, Rollover Subcommittee reports 6/88-10/89
9. NHTSA report to Congress, "Rollover Prevention & Roof Crush," 4/92
10. NHTSA, "Planning Document for Rollover Prevention & Injury Mitigation," 9/92

## **O. RULEMAKING**

1. ANPRM (Rollover Resistance), 38 FR 9599, 4/18/73
2. Summary of Comments received, NPRM (Rollover Resistance), 10/5/73
3. Federal Register Notice of Proposed Rule on Utility Vehicle warning sticker, Docket #82-20, 12/30/82
4. Suzuki to NHTSA on NPRM (Utility Vehicle Warning Stickers), 2/9/83
5. Ford to NHTSA on NPRM (Utility Vehicle Warning Stickers), 2/11/83
6. MVMA to NHTSA on NPRM (Utility Vehicle Warning Stickers), 2/14/83
7. GM to NHTSA on NPRM (Utility Vehicle Warning Stickers), 2/14/83
8. Regulation Part 575.105 Utility Vehicles
9. Representative Wirth (CO) to NHTSA, petition for minimum stability standard, 9/16/86
10. AMC to NHTSA on Wirth petition, 1/21/87
11. NHTSA denial of Wirth petition, 53 FR 12218, 4/13/88
12. Consumers Union rulemaking petition, 6/2/88
13. NHTSA to Consumers Union, granting petition to begin rulemaking, 9/1/88
14. ANPRM (re: Side Impact Protection for LTV's), 53 FR 31716, 8/19/88
15. Comments in Response to Docket 88-06-No. 4
  - a. Summary of comments, 1/12/89
  - b. GM comments, 10/18/88, including: Attachment 1; Enclosure B- D.F. Huelke, et al., University of Michigan Transportation Institute, "Injury Severity, Ejection, & Occupant Contacts in Passenger Rollover Crashes," 1985; Enclosure E- K.F. Orłowski, et al., GM, "Rollover Crash Tests- The Influence of Roof Strength on Injury Mechanics," 1985
  - c. Chrysler comments, 10/18/88
  - d. IIHS comments, 10/18/88
  - e. Toyota comments, 10/18/88
  - f. Ford comments, 10/18/88
  - g. Flachglas AG comments, 10/12/88. (Enclosures in German omitted) Enclosures: R.G. Rieser, et al., "Safety Performance of Laminated Glass Structures," PPG Industries, 5/70; P.C. Begeman, et al., "Safety Performance of Asymmetric Windshields," 22nd Stapp Car Crash Conference; A. Slattenschek, et al., "Efficiency of Phantom Impact Test in Safety Glass Testing," 18th Stapp Car Crash Conference
16. Final Rule, Extension of FMVSS 216 (Roof Crush Prevention) to Light Trucks, 56 FR 15510, 4/17/91
17. NHTSA, "Preliminary Regulatory Evaluation- ANPR- Light Duty Vehicle Rollover Prevention" (re: 57 FR 242), 7/91 (Sections relating to rollover/roof crush only)
18. ANPRM (Proposal of Rollover FMVSS), 57 FR 242, 1/3/92
19. Comments in Response to Docket 91-68-No.1
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  - h. Advocates for Highway & Auto Safety, 4/3/92
20. Request for Comments, 57 FR 44721, 9/29/92 (Docket 91-68-No.2)
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  - i. L. Robertson, Nanlee Research, comments on Chrysler, 6/12/93
  - j. NHTSA and AAMA meeting notes, 8/19/93

22. Department of Transportation Press Release, 6/23/94
23. NPRM (Rollover Proposal), 59 FR 33254, 6/28/94 (Docket 91-68-No.3)
  - a. "Preliminary Regulatory Evaluation"
  - b. "Potential Reductions in Fatalities & Injuries in Single Vehicle Rollover Crashes as a Result of a Minimum Rollover Stability Standard"
24. Comments in Response to Docket 91-68-No.3
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  - g. MCR/LRI Inc. comments, 8/26/94
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  - j. Advocates For Highway and Auto Safety petition for reconsideration of rulemaking termination, 7/28/94.
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25. Consumers Union rulemaking and defect investigation petition, 8/20/96
26. Grant of CU Rulemaking Petition, 62 FR, 27578, 5/20/97
27. Denial of CU Defect Petition, 62 FR, 40602, 7/29/97
28. NPRM, Rollover Information Ratings, 65 FR, 34998, 6/1/00
29. Final Rulemaking, Rollover Resistance, 66 FR, 3388, 1/12/01

## **P. BIBLIOGRAPHY**