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United States of America

Informal document No. GRSP-38-18  
(38<sup>th</sup> GRSP, 6-9 December 2005,  
agenda item D.2.)

# United States of America Roof Crush Proposed Rulemaking FMVSS 216

December 8, 2005



# Background

- United States was the first country to establish requirements limiting roof crush in 1973
  - Since then, only Canada and Saudi Arabia have adopted roof crush standards, and have the same requirements as the US standard
  - Roof crush is part of comprehensive rollover safety plan
    - Other aspects of comprehensive plan are ESC, ejection mitigation, door latches.
  - Belted occupants will benefit most from this rule
    - Unbelted occupants benefit little since they don't remain in their seat and ejection is their biggest risk factor

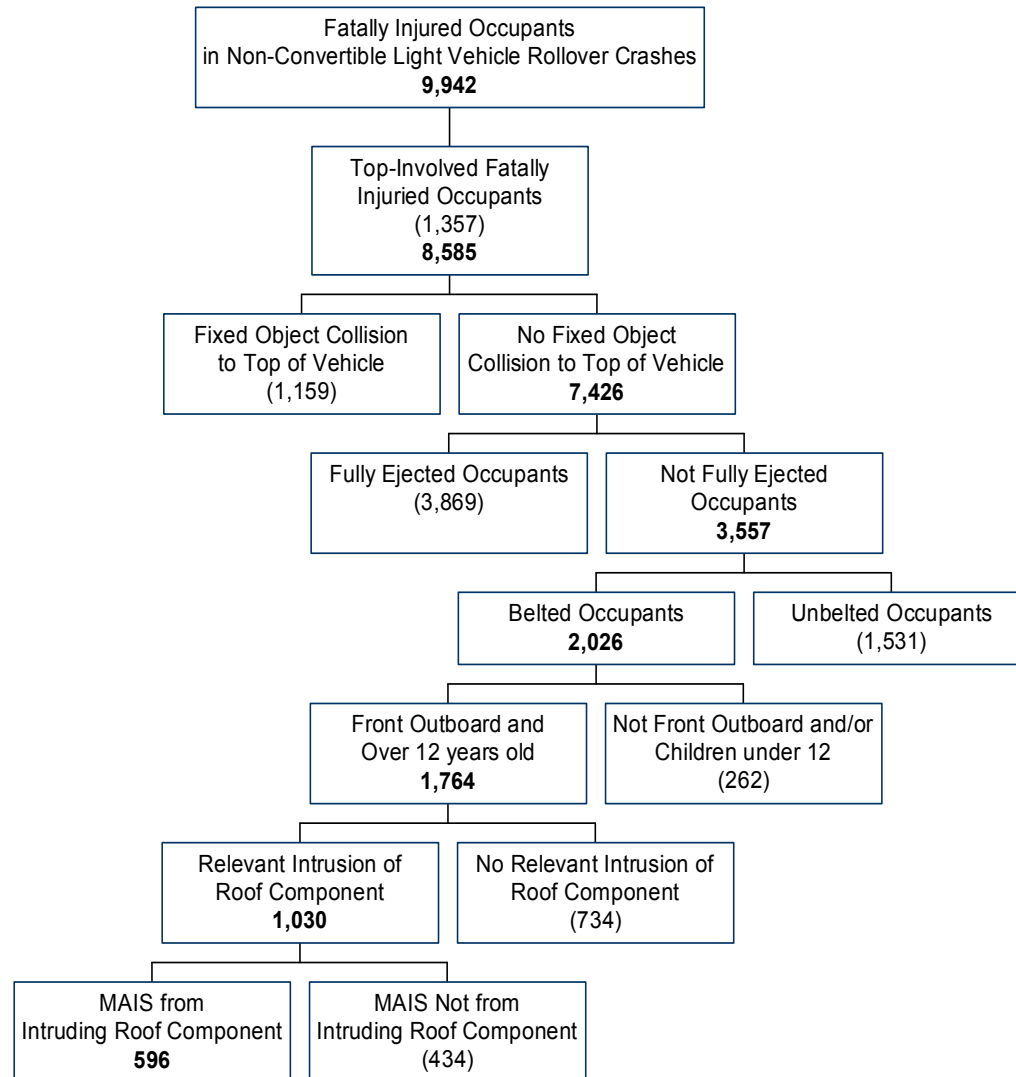
# Background

- Safety Problem
  - Out of the 33,000+ deaths and serious injuries in rollovers each year, this proposal will benefit a portion of about 600 fatally and 800 seriously injured belted occupants who receive head injuries due to roof intrusion
    - The injury mechanism is the interaction of the belted occupant's head/neck with the vehicle roof
  - Upgrade based upon analysis of post-crash reduction in available headroom space

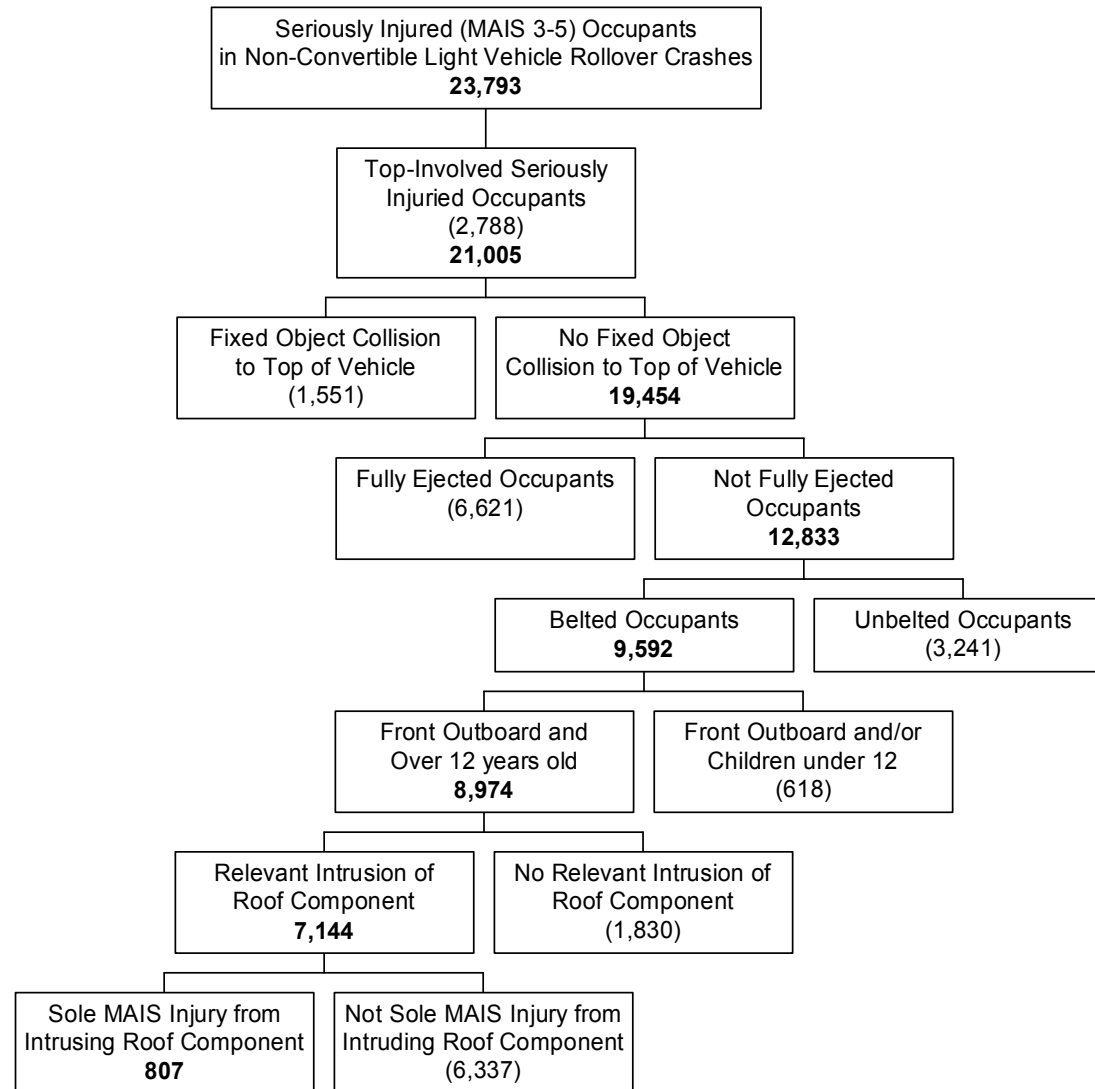
# Summary of Proposal

- **Application** (Currently vehicles up to 6,000 pounds GVWR)
  - Extend application to 10,000 pounds GVWR
- **Load requirement** (Currently 1.5 times vehicle weight, with a 5,000# limit for cars)
  - Increase load requirement to 2.5 times vehicle weight
  - Eliminate 5,000# force limit on passenger cars
- **Headroom requirement** (Currently requires crush to be no more than 5 inches, without reference to available headroom)
  - 50<sup>th</sup> percentile Hybrid-III placed in the front outboard seat position
  - Under specified load, no roof component may contact the dummy
  - In lieu of current ram displacement limit @ 1.5x vehicle weight
- **Vehicles manufactured in two or more stages, other than chassis-cabs**
  - Allow certification option for roof crush requirements of FMVSS No. 220, instead of FMVSS No. 216.
    - Horizontal plate load application
    - Crush less than 5" @ load of 1.5x vehicle weight

# Estimated Annual Fatalities FARS/NASS-CDS (1997-2001)



# Estimated Annual Seriously Injured NASS-CDS (1997-2001)



## Benefits and Cost Analysis

- **Cost estimate ~ \$88 - \$95 million**
  - Cost/new vehicle ~ \$11.81 (@ 2.5x requirement)
  - Fuel costs/vehicle ~ \$5.33 to \$6.69 (@ 2.5x requirement)
- **Benefit estimates 13 – 44 fatalities**
  - 500 – 800 injuries
  - Cost/ELS ~ \$2.1 – 3.4M

## Status of Rulemaking

- **Notice of Proposed Rulemaking**
  - Published August 23, 2005
  - Comment period closed November 21, 2005
  
  - Regulation text, associated reports, and comments are posted at:
    - <http://dms.dot.gov>
    - Docket Number: 22143