GREGORY MINI SPACER
Guardrail System

• Improves performance of standard W-Beam.
• No need for conventional offset blocks.
• Widens roadway up to 2 feet.
Gregory Industries takes a step forward in the performance of steel post highway guardrail systems with the Gregory Mini Spacer (GMS). This revolutionary engineered solution overcomes blockout variables while optimizing guardrail release behavior. The result is improved control even in the presence of extreme guardrail forces. GMS largely eliminates the variability problems and failure modes of block-mounted guardrail. Its engineered performance advantages address these unfavorable crash results:

- Vaulting.
- Vehicle pocketing.
- Wheel snagging.
- Vehicle destabilization.
- Guardrail rupture.
- Occupant compartment deformation.

**AT A GLANCE**

- New, better technology for W-Beam guardrail systems.
- Engineered for predictable release and improved performance.
- Eliminates blocks and their variable performance characteristics.
- Widens roadway up to 2 feet.
- Single-bolt installation.
- Less material to haul.
- Eliminates variability that relies on slot deformation.
- Works with both strong and weak post systems.
- Consistent release regardless of bolt tightness, slot position or guardrail thickness.
- Retrofits to all existing systems.
- Full-scale crash tested and NCHRP 350 approved.

**SELF-ALIGNING/POSITIONING FASTENER:**

**CLAMPING FASTENER:**
NCHRP REPORT 350 TEST 3-10
SMALL CAR
IMPACT TEST SUMMARY

GENERAL INFORMATION
Test Agency .......... Southwest Research Institute
Test Number ..................... GMS-2
Test Date ......................... 09/13/2006
Test Category ................... 3-10

TEST ARTICLE
Type ................................ Longitudinal Barrier
Installation Length ............. 187.5 ft. (57.15 m)
Nom. Barrier Height .......... 31 in. (787 mm)
Type of Primary Barrier ........ Modified G4-1S
SOIL ............................... Stable, Moist - "Standard" Soil

TEST VEHICLE
Type .................. Small car
Designation .................... 820C
Model .................... 2001 Suzuki Swift
Mass (kg) ...................... 820

Inertial Mass (kg) .................. 820
Dummy Mass (kg) ................ 73
Gross Static Mass (kg) .......... 893

IMPACT CONDITIONS
Speed (km/hr) .................. 106.3
Angle ................................ 18.8°

EXIT CONDITIONS
Speed (km/hr) .................. 30 (calculated)
Angle ................................ 13.5°

OCCUPANT RISK VALUES
Impact Velocity (m/s) .......... 7.6
x-direction
y-direction
Ride-Down Accelerations (g's)
 x-direction
y-direction

POST IMPACT VEHICULAR BEHAVIOR
(limited to events <1,000 seconds)
Maximum Roll Angle .......... 7.8° @ 0.265 sec.
Maximum Pitch Angle .......... -5.2° @ 0.998 sec.
Maximum Yaw Angle .......... -97.1° @ 0.998 sec.

TEST ARTICLE DEFLECTION
Dynamic ......................... 2.2 ft. (0.66 m)
Permanent ..................... 1.8 ft. (0.56 m)

VEHICLE DAMAGE
Exterior
cDC ................... 11LFEW5
VDS .................. 11-LFQ-3

Interior
OCDI ....................... LF0000000
Max. Deform. (mm) .............. 0

NCHRP REPORT 350 TEST 3-11
FULL SIZE PICKUP TRUCK
IMPACT TEST SUMMARY

GENERAL INFORMATION
Test Agency .......... Southwest Research Institute
Test Number ..................... GMS-1
Test Date ......................... 08/17/2006
Test Category ................... 3-11

TEST ARTICLE
Type ................................ Longitudinal Barrier
Installation Length ............. 187.5 ft. (57.15 m)
Nom. Barrier Height .......... 31 in. (787 mm)
Type of Primary Barrier ........ Modified G4-1S
SOIL ............................... Stable, Dry - "Standard" Soil

TEST VEHICLE
Type ............................. ½ Ton Quad Cab Pickup
Designation ................. 2270P
Model .................. 2002 Dodge Ram 1500 Quad Cab
Mass (kg) ...................... 2,197

Inertial Mass (kg) .................. 2,197
Dummy Mass (kg) ................ NA
Gross Static Mass (kg) .......... 2,197

IMPACT CONDITIONS
Speed (km/hr) .................. 97.7
Angle ................................ 25.9°

EXIT CONDITIONS
Speed (km/hr) .................. 65 (calculated)
Angle ................................ 12.0°

OCCUPANT RISK VALUES
Impact Velocity (m/s) .......... 5.0
x-direction
y-direction
Ride-Down Accelerations (g's)
 x-direction
y-direction

POST IMPACT VEHICULAR BEHAVIOR
(limited to events <1,000 seconds)
Maximum Roll Angle .......... -12.3° @ 0.506 sec.
Maximum Pitch Angle .......... -6.2° @ 0.674 sec.
Maximum Yaw Angle .......... -35.9° @ 0.542 sec.

TEST ARTICLE DEFLECTION
Dynamic ......................... 2.92 ft. (0.89 m)
Permanent ..................... 1.8 ft. (0.56 m)

VEHICLE DAMAGE
Exterior
cDC ................... 11LFEW5
VDS .................. 11-LFQ-3

Interior
OCDI ....................... LF0000000
Max. Deform. (mm) .............. 0
MINI SPACER INSTALLATION WITH W-BEAM GUARDRAIL

The benefit of GMS is the way it adds predictability to guardrail release without depending on slot deformation or complex kinematics. GMS improves release characteristics of strong post systems by allowing the post to move out of the way upon impact. The “escaping” guardrail maintains its strength and “W” profile, better containing and redirecting impacting vehicles.

GMS is easy to install because it is self-aligning.

Small offset of guardrail from post accommodates installation variations such as post placement. Back view (top left) and front view (top right) show how GMS components are simple to install.

Schematic demonstrates how the guardrail releases as force reaches its threshold.