Speed Humps on Steep Streets

Gabriel Ho, P.E.
Livable Streets Subdivision
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Co-Authors:
Kate Beck, SafeTREC
Casey Hildreth, SFMTA
Traffic Calming Program by the numbers

• 100+ applications per year
• 100+ speed humps or variants installed per year
• Speed humps reduce 85th %ile speeds by 6 mph
Traffic Calming Program
Acceptance Criteria

• Proximity to schools, parks, senior centers
• Speed & Volume thresholds
• Restricted on arterials, multi-lane roads, grades >12%
• 8-12% case-by-case only
Roadway Slopes

9-12%

>12%
Question:

Do speed humps on steeper roadways present traffic safety or driver/passenger comfort issues?
Initial Research

- Literature Review
  - *ITE Guidelines for the Design and Application of Speed Humps (1993)*
- Interviews with other jurisdictions
  - Portland
  - New Jersey DOT
  - Delaware DOT
Field Test Locations:

• Four blocks with existing speed humps
• Blocks with slopes of 1%, 4%, 8%, 13%
• Crash analysis
• Resident feedback
Field Testing Procedure:

Speed runs @ 15, 20, 25, 30mph uphill and downhill over speed hump

1. Driver rating of vehicle control
2. Driver/Passenger rating of comfort
3. Measure acceleration during deflection
Field Testing Procedure:

Physics Toolbox Accelerometer

- g-Force in x, y, z axes
- Recording 200Hz
- Output to .CSV
- Averaged into 0.04sec bins
Accelerometer Reading

g-force measured in passenger seat

(seconds)
Field Test Findings:

g-force increases with speed, not slope
Conclusions:

Speed humps on various grades perform similarly:
- Crash history
- Comfort
- Deflection forces
Policy Change

• Increase standard max grade to 13%. >13% to be considered case-by-case

• Emphasis on advanced warning markings and advisory speed signs
Research Next Steps

• Effects on Bicycles, Heavy Vehicles
• Cold climates
• Slopes >13%
Thank You

Gabriel Ho
SFMTA Livable Streets
gabriel.ho@sfmta.com

sfmta.com/traffic-calming
SF Standard Speed Hump

MAX HEIGHT: 3.25”–3.75”
2.71”–3.13”
2.17”–2.50”
1.62”–1.88”
1.08”–1.25”
0.54”–0.63”

DIRECTION OF TRAVEL

FINISHED SURFACE OF SPEED HUMP

FINISHED GRADE OF EXISTING ROADWAY

6’
12’
CROSS SECTION (FRONT VIEW)

MAX HEIGHT: 3.25" - 3.75"
2.71" - 3.13"
2.17" - 2.50"
1.62" - 1.88"
1.08" - 1.25"
0.54" - 0.63"

DIRECTION OF TRAVEL

FINISHED SURFACE

OF SPEED HUMP

FINISHED GRADE OF
EXISTING ROADWAY

NOTE: VERTICAL MEASUREMENTS SHOWN TO THE LEFT OF CENTERLINE ARE MIRRORED ON THE RIGHT HALF OF SPEED HUMP.

PROFILE SECTION (SIDE VIEW)

PLAN VIEW (TOP VIEW)

WHITE CHEVRON DETAIL:

OPTION A: TYPICAL ONE-WAY STREET

OPTION B: TYPICAL TWO-WAY STREET

OPTION C: NARROW TWO-WAY STREET

DIRECTION OF TRAVEL

*CHEVRONS ARE TYPICALLY CENTERED ON THE APPROACHING LANE

STRIPPING DETAIL

SIDEWALK

FINISHED SURFACE

EXISTING ROADWAY

GUTTER

SIDEWALK