Retrofitting Bridge Rails
Retrofitting Bridge Rails

- Repairs, Retrofits & Upgrades – What is TxDOT’s & FHWA’s policy
- Necessary Information – What information does a designer need?
- Examples
Repairs, Retrofits & Upgrades
TxDOT & FHWA Policy

Project Specific Requirements
Project Types

- 2R & Maintenance – Non freeway resurfacing or restoration projects that are not on the national system
- 3R - The scope varies from minor safety improvements to more complete rehabilitation projects
- 4R - Reconstruction or New construction projects
Governing Specifications

- MASH – AASHTO Manual for Assessing Safety Hardware
- NCHRP Report 350 – National Cooperative Highway Research Program
- NCHRP Report 230 – National Cooperative Highway Research Program
Preventative Maintenance & 2R

- Replacement with a bridge railing meeting MASH or NCHRP Report 350 is recommended but not required.
- Must meet minimum height requirement shown in the Bridge Railing Manual.
- Existing railing that does not meet the height standard or MASH or NCHRP Report 350 must be upgraded.
3R, Not Widened & No work affecting Existing Railing

- Replacement with a bridge railing meeting MASH or NCHRP Report 350 is recommended but not required
- Must meet minimum height requirement shown in the Bridge Railing Manual
- Existing railing that does not meet the height standard or MASH or NCHRP Report 350 must be upgraded
3R, Widened and/or Work Affecting Existing Rail

- All railing on structure must comply with MASH or NCHRP Report 350
- Exceptions
  - Design Exception required if ADT is greater than 1500 VPD
  - Design Waiver required if ADT is less than 1500 VPD
4R

- Bridge railing must comply with MASH or NCHRP Report 350
- Exceptions by approval of Design Exception Request
MBGF & Transitions

- MBGF & Transitions must be upgraded if the bridge rail is upgraded
- MBGF & Transitions may be upgraded without upgrading bridge railing
Required Design Information

- New design requirements
- Existing Plans
- Field verification
New Design Requirements

- Type of retrofit, repair, or upgrade
- Roadway design speed
- Proposed finished depth of overlay
- Desired transition type
- Deck drain requirements
Existing Plans

- Layouts (Widened Structure & Original)
- Abutments
- Joint Information
- Existing Approach Slab Details
- Spans
- Rail
Field Verification

- Existing railing type
- Height of existing railing
Field Verification

- Slab Depth
- Overhang width & depth
- Curb width & depth
Field Verification

- Abutment Geometry
- Wing Geometry
Field Verification

- Joint Information
- Existing overlay depth

NO TRAVEL WAY CROSS SLOPE WITH EXCESSIVE NORMAL OVERLAY
Field Verification

- Location of nearby road crossings
- Existing Approach Slab Conditions
- Existing slopes
Photos

- Existing Rail Average Ht (both sides)
- Existing Rail Terminal Ht (all corners)
- Photo with direction info (all corners)
- Photo of typical overhang
Undocumented Changes
Undocumented Changes

Gas Line
Undocumented Changes

- Undocumented Installation of MBGF Turndown on Bridge Curb
- Undocumented Extension of the Wingwall
- Undocumented Installation of Concrete Curb Transition
- Undocumented Installation of Riprap & Drainage Swale
Transition Details
Example Projects
Height Upgrade
Transition Upgrade

SHOWING COMPLETED BREAKBACKS
Approach Slab not shown for clarity

SHOWING INSTALLATION OF NEW RAIL ANCHORAGE SLAB & CURB
Approach Slab not shown for clarity
Transition Upgrade

SHOWING INSTALLATION OF NEW RAIL & APPROACH CURB CONCRETE

Approach Slab not shown for clarity
T101 RC
T101 RC

TYPICAL PLAN AT END OF RAIL

TYPICAL SECTION THRU CURB & RAIL
C402 Retrofit
C402 Retrofit

Traffic Rail Foundation

Saw cut existing wingwall to a new line

Face of C402 (MOD) Rail

Existing Wingwall Cap

Traffic Signal & Foundation

Pedestrian Signal & Foundation

Electric Meter

wU Anchor Bar Area

Left Rock Anchor Bar Area
C402 Retrofit

SECTION A-A
(Showing parapet wall at end of C402 Rail.)

SECTION B-B
(Showing parapet wall at end of C402 Rail.)
C1W Retrofit
C1W Retrofit

EXISTING ABUTMENT PLAN
(Showing retrofit foundation on existing abutment for C1W Rail)
RAC-R
Quality Control - Inspection
Summary

- Replacement requirements are dependent on the type of project
- Provide the designer with existing plans, photos, and new design requirements
- Inspection of the contractors work is imperative
Credits

❖ Photos – Miscellaneous districts, Scott Dziekan, Nick Nemec, Bridge Division Field Section
❖ Design Details – John Holt, Jim Pitzer & JT Ries
Questions?