

Development Process for Improving Roadside Safety Features

MGS's Journey to the Roadside

By

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What I hope you get out of this is...

- It can take a long time to get things from research to roadside.
- Common issues getting research to the roadside
- Researchers Look to Keep It Simple Stupid (KISS)

Coming Soon to a Road near you... Maybe

- It can take a while...
 - Step 1 “Identified” to “Solved”
 - Step 2 “Solved” to “Standard”
 - Step 3 “Standard” to “On the Road”
 - Step 4 “On the Road” to “Everywhere”
- A lot of different people are involved



Individual Project



Can be almost anyone



Researcher



Planner/Designer

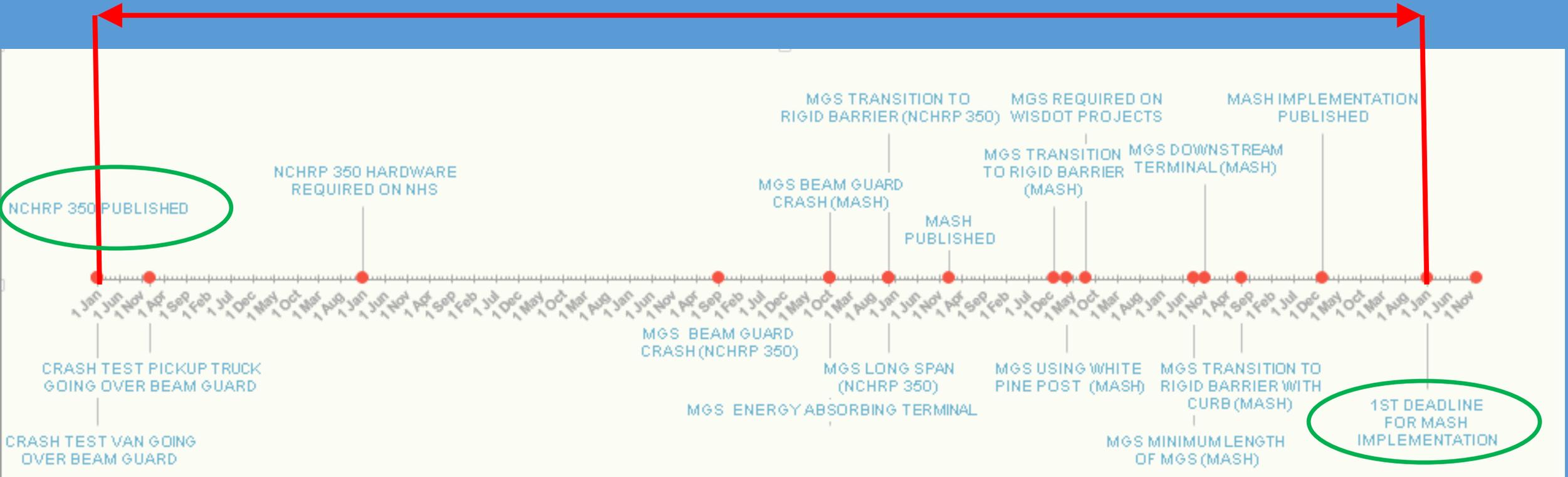


Project Manager/Contractor

← Erik floats are round this area →

MGS's Timeline

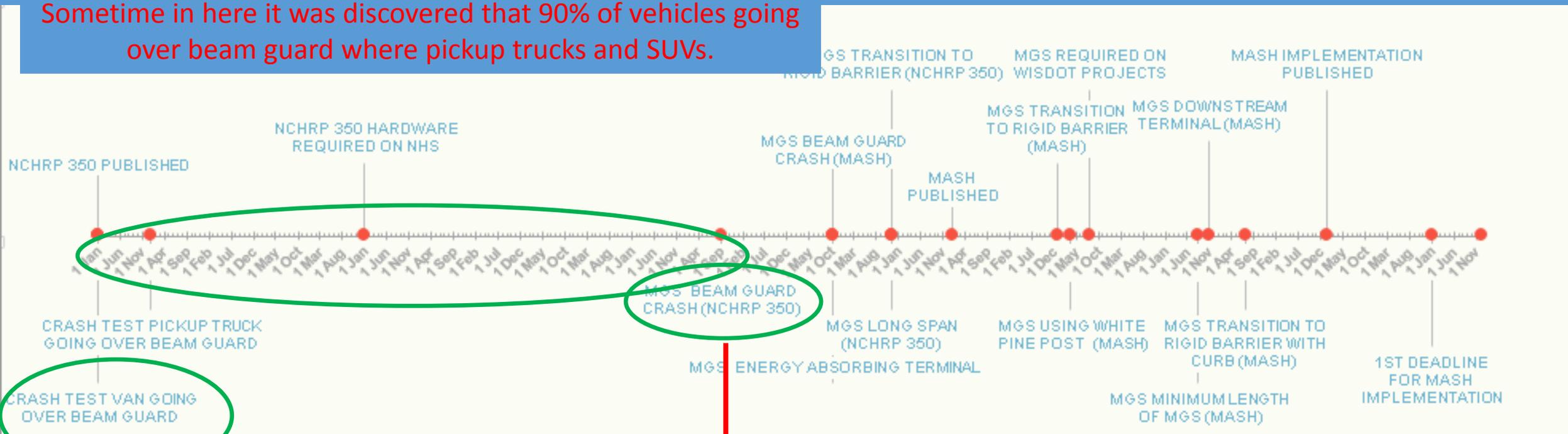
About 25 Years



MGS's Timeline... "Identify" to "Solve"

Pickup truck and SUV sales are going up and up...

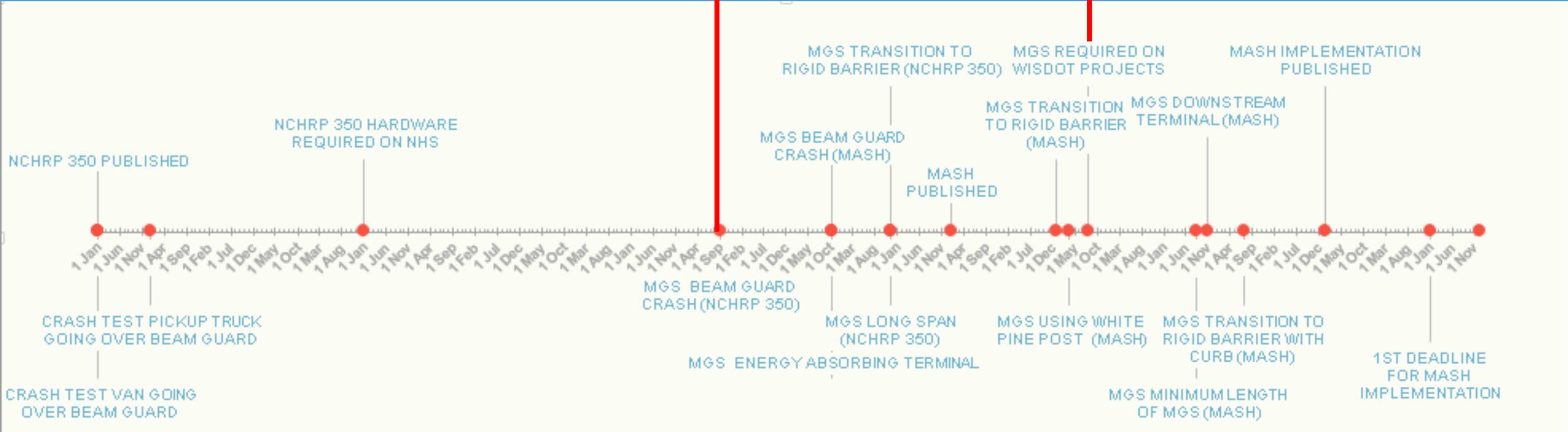
Sometime in here it was discovered that 90% of vehicles going over beam guard where pickup trucks and SUVs.



About 11 Years

MGS's Timeline "Solved" to "Standard"

About 5 Years



“Solved” to “Standard” Why didn't we implement sooner?

We needed more than the middle section of beam guard installation



A “roadway barrier” is a system of individual components.

“Solved” to “Standard” We need to have



Crashworthy Approach
Terminal - Proprietary



What to do when there is
poor grading behind Beam
Guard?



What to do when there is a
culvert preventing Beam
Guard to be installed – Long
Span

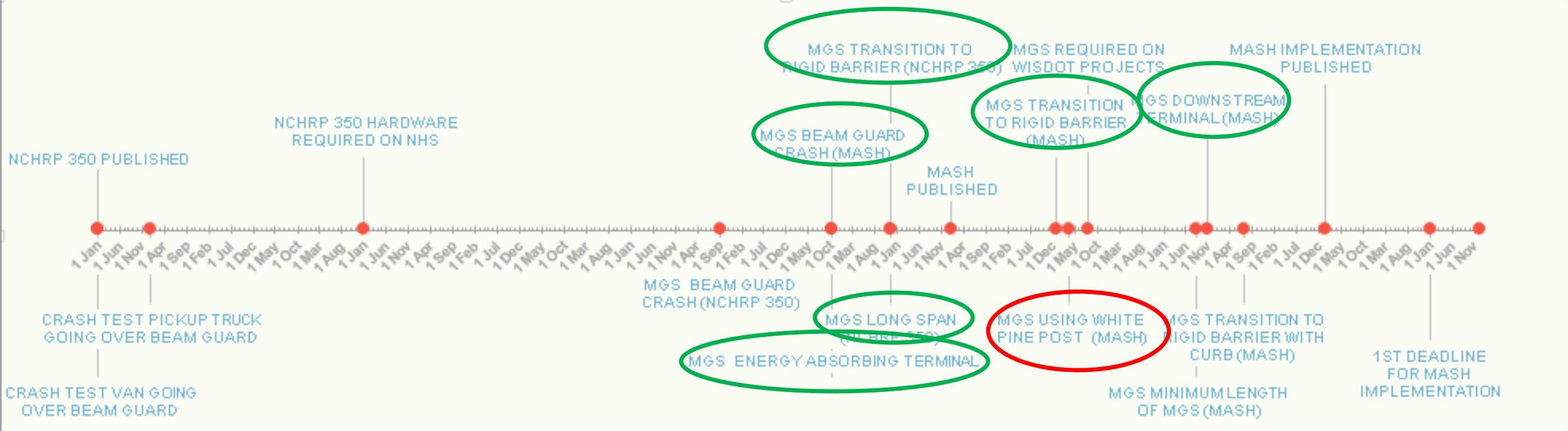


How to go from Beam Guard to Rigid Barrier?



What to do on the downstream end of a one way road?

MGS's Timeline "Solved" to "Standard"



“Solved” to “Standard”

Other issues getting to a standard....

- Cost of change
 - Sometimes this is unknown
 - Sometimes people care very little or care too much about this
- Institutional Resistance
- External Resistance
 - Someone makes money on the way things are...
- Expertise to understand, write guidance, and coordinate with others

“Solved” to “Standard”

Internal Resistance – Roadside Design Examples

- We done this his way for years...
 - People have not been trained on the proper operation of roadside devices
 - Critical impact crashes are rare... leads to a perception that they don't have to worry about it
- Have to coordinate with other units or sections within your agency
 - May not be top priority for other units and teams

“Solved” to “Standard”

Institutional Resistance: “An AASHTO document does not say I have to do this...”

- AASHTO’s Guidance is the best guidance you can get 50 states to agree to:
 - It may not be the best guidance
 - It may not be the most current guidance
 - It may not be based on good technical data
- It is typically written using “suggested” and “recommended”
 - Some state super sensitive to lawsuits so they don’t to be directed to do something...
 - In some cases, if you get into the technical aspects of research and participate in research you start to find out that “suggested” and “recommended” are weak words to use.

Exteri

January 28, 2014

Background

Recently passed legislation requires that WSDOT reintroduce the option of using wood guardrail posts for new guardrail installations. ESSB 5024 Section 306(17) states:

“The legislature finds that there are sixteen companies involved in wood preserving in the state that employ four hundred workers and have an annual payroll of fifteen million dollars. Prior to the department's switch to steel guardrails, ninety percent of the twenty-five hundred mile guardrail system was constructed of preserved wood and one hundred ten thousand wood guardrail posts were produced annually for state use. Moreover, the policy of using steel posts requires the state to use imported steel. Given these findings, where practicable, and until June 30, 2015, the department shall include the design

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“Solved” to “Standard”

Other issues getting to a standard...

- Expertise to understand and write guidance
 - If I cannot understand the research report... I hesitant to put it into a standard
 - If I cannot understand the research report, how are designers, field staff, and contractors who are pressed for time understand this?
 - I have to boil down hundreds of pages of research down to a paragraph or two

“SAFETY TREATMENT OF ROADSIDE PARALLEL-DRAINAGE STRUCTURES” by Hayes E. Ross Jr, T.J. Hirsch, and Dean Sicking

- 184 page report becomes:

- EDM

2.2.10 Traversable Grate for Hazardous Cross Drains

Hazardous cross drains within the clear zone on roadways with AADTs of 750 or greater warrant traversable endwalls.^{xii} (Refer to discussion in [FDM 11-45-2.6](#)).

2.2.11 Traversable Grate for Hazardous Parallel Culverts

Hazardous parallel drains within the clear zone on roadways with AADTs of 100 or greater warrant traversable endwalls.^{xiii} (Refer to discussion in [FDM 11-45-2.6](#)).

- 2 standard detail drawings
- 72 bid items
- This can be a huge task by itself just to get the guidance technically correct and written and coordinated

“Solved” to “Standard”

Coordination

Simple Design Change



Erik Erik's Boss FDM Editor



Timing of getting approvals can shift implementation a year.

It may shock you... Not everybody agrees

Does not include training staff

Group of Contractors

Boss

Committee

FDM Editor

FHWA



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“Standard” to “On the Road”

About a 6 month transition requiring most but not all installations to be MGS.



6 Months?

- We had almost all the same alternatives as our older standard
- Minor cost difference
 - Estimated less than a dollar
 - Last year bid average \$0.51 per foot difference
- Minor change in shoulder width might be needed on some projects
- Allowed some case-by-case exceptions
 - Shoulder was already too narrow
 - 2 out of 4 quadrants on a bridge project needed to have short radius beam guard
- Implementation can depending on who is involved an

“On the Road” to “Everywhere”

End Treatment Example

- 1974 AASHTO Highway Design and Operational Practices related to Highway Safety identified approach blunt end beam guard as a problem
- 1990 FHWA memo indicted that sloped end treatments beam guard ends should not be used on NHS.
- September 29, 1994 FHWA Memo
 - Replace all blunt end treatments on high speed NHS within 2 years of memo
 - 1 year from now no new downturned guard rail ends on high speed NHS
 - Replace existing downturned ends guard rail ends on high speed NHS as work is done by them
- 2008 inventory survey indicated that 48% of end treatments we blunt ends, sloped end treatments or other non crashworthy end treatment on the NHS
- 2016 less than 200 non-nchrp end treatments exist (estimate) on NHS

“On the Road” to “Everywhere”

- What does “should” mean to a project engineer verses a standard engineer?
 - Write standards to require work be done or provide documentation on why a standard cannot be applied.
- People will “creatively” interpret standards to avoid work
- Explain why something is important in a standard.
- If there is no enforcement of a standard – good luck.
- Project staff are track on “time” and “budget” not “safety” and not “good design”

Closing

- Write simple summaries – complex (but not overly) complex bodies of reports
 - What grade level is your writing?
- Writing for other academics is different than writing for designers, construction staff, and contractors.
 - You may need to explain techniques more carefully/simply.
 - Don't write to impress the audience – write to help them understand
- Provide tools, drawings, examples to help implementation
- Show your work and assumptions
- Be careful writing recommendations