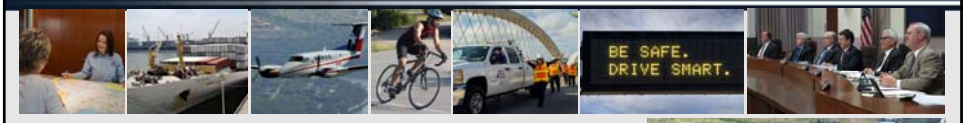
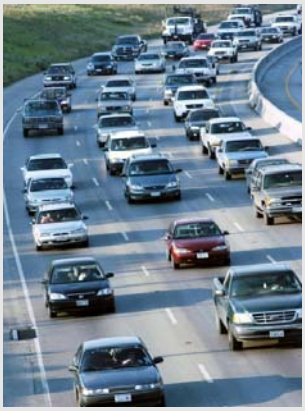
TEXAS DEPARTMENT OF TRANSPORTATION



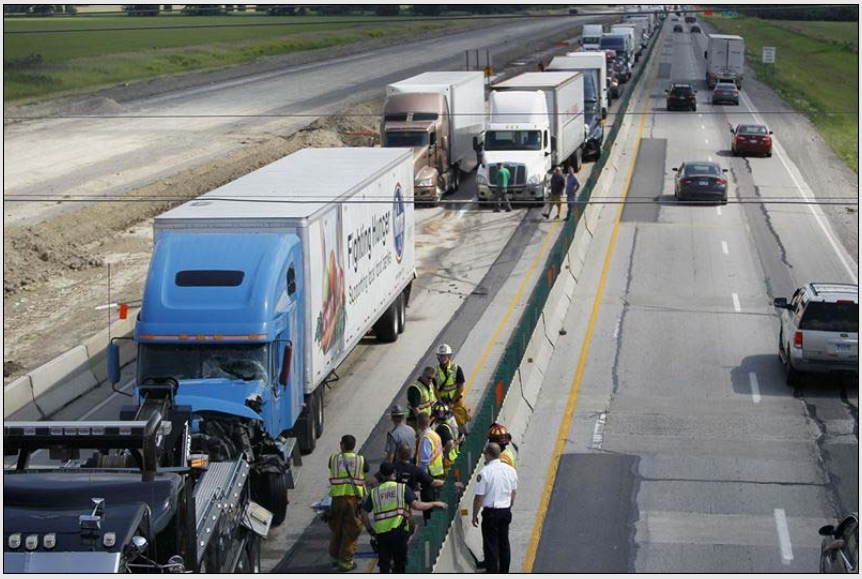
WORK ZONE SAFETY



Tracy D. Cain, P.E
Construction Division Director

April 2016

Major Delays



2

Crash Scene Investigation – Fatality

3

Stated Mission

Provide Safe and Reliable Transportation Solutions

4

Two Safety Initiatives at TxDOT

Temporary Rumble Strips
&
Safety Contingency in Projects

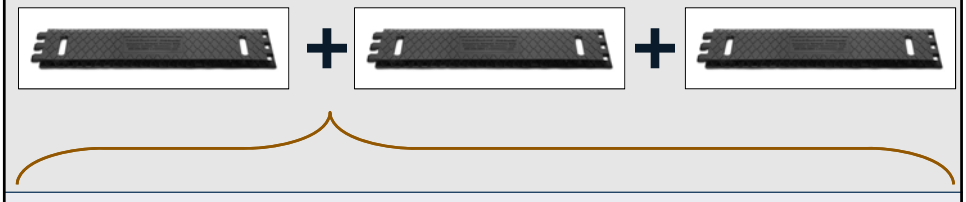
5

What are Temporary Rumble Strips?

- Creates similar effect as standard edge/center line rumble stripes
  - Driver will feel & hear the bumps
- Portable (no glue or nails)
- Placed in accordance with TxDOT standard WZ(RS)-13
- Currently only approved strip is *RoadQuake 2* by Plastic Safety Systems, Inc.

6

What are Temporary Rumble Strips?



7

Why are they needed?

To ensure drivers are aware of upcoming work zones in order to protect the workers and drivers

8

Why are they needed?

Distracted Drivers

Visual

Manual

Cognitive

9

Why are they needed?

Tired Eyes

Sleepy

Inattentive

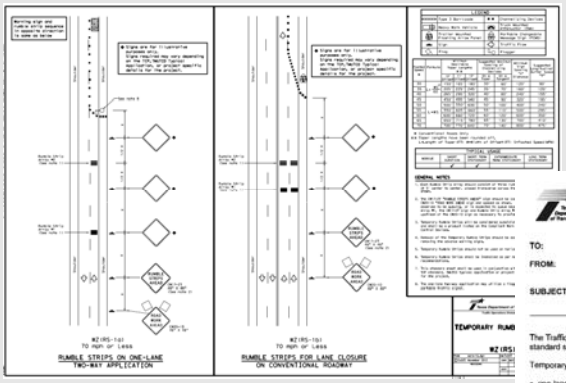
10

Why are they needed?

Additional method to warn and protect motorists

11

TxDOT Standard WZ(RS)-12



MEMORANDUM

TO: District Engineers DATE: November 12, 2012

FROM: Carol T. Rawson, P.E., Director Traffic Operations Division

SUBJECT: Work Zone Temporary Rumble Strip Standard Sheet

The Traffic Operations Division has developed the Work Zone Temporary Rumble Strip standard sheet, WZ(RS)-12, for use on temporary lane closures to enhance safety.

Temporary rumble strips are to be used on:

- one-lane, two-way flagging operations with a posted speed limit of 70 mph or less
- lane closures on conventional highways with a posted speed limit of 70 mph or less

If Portable Traffic Signals or Automated Flagger Assistance Devices are used in lieu of flaggers for lane closures, this standard sheet also applies.

This standard sheet is required for Construction and Maintenance let projects that meet either of the conditions listed above starting with the May 2013 letting.

The temporary rumble strip standard sheet is to be used immediately by district maintenance crews as soon as the rumble strips become available in the warehouse.

The General Services Division (GSD) has placed a one-time purchase order for the temporary rumble strips and they will be stocked at the Athens and Seguin distribution centers. Attached is a list with the total number of complete sets that has been ordered for each district. Each complete set will comprise of 36 temporary rumble units. A strip is made of 3 units. An array will have 3 strips (9 units). Four arrays will make a complete set of temporary rumble strips. GSD has also ordered 2 "RUMBLE STRIPS AHEAD" signs and portable sign stands for each complete set of rumble strips.

Began with May 2013 Let Construction and Maintenance project

12

Revised WZ(RS) - 14 Standard Sheet

- New Standard outlines the use of Temporary Rumble Strips
- Standard allows for some TRS to be optional
- Approved for 75 mph or less
- Began with May 2013 Letting

TABLE 1

Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2

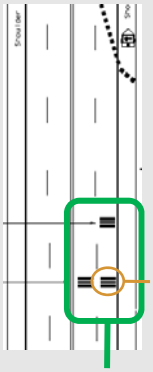
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.

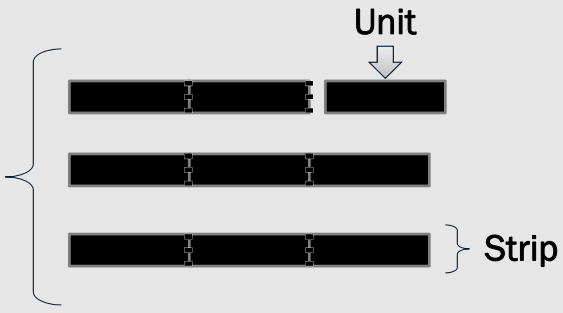
TxDOT Standard WZ(RS)-14

Understanding the Terminology

WZ(RS-1b)-14

1 Complete Set = 3 Arrays = 9 Strips = 27 Units





14

TxDOT Standard WZ(RS)-14

When should a project use temporary rumble strips?

Current Requirement

- One-Lane, Two Way flagging** operation with a posted speed of 75 MPH or less
- Lane closures** on a road or highway with a posted speed limit of 75 MPH or less

**NOTE: Includes Portable Traffic Signals and Automated Flagging Devices

Optional

- Freeways
- Expressways

15

What We've Learned

Do not place on:

- Horizontal Curves
- Fresh Seal Coat Jobs
- Bleeding Asphalt
- Soft Pavement
- Heavily Rutted Roads

16

What We've Learned

Installation Issues

- Must install properly to be effective and remain in place
- Potential noise complaints
- Weight

17

Safety Contingency

- Webster's Dictionary defines "contingency" as "an event that may but is not certain to occur."
- The Safety Contingency is an amount included in the construction budget to cover the cost of possible enhancements in work zone safety.

18

Establishing The Safety Contingency In Projects

- Needs to be included on all contracts
  - Document reason if not included in a project
- Add it to the Engineer's Estimate as a Contractor Force Account
- Estimate the total amount
  - 2% to 5% Engineer's Estimate
- 9606-2056, Force Account – Safety Contingency (Unit=DOL)

19

How Can It Be Used

- Portable changeable message signs
  - Allows drivers to make informed travel choices
- Dynamic speed message signs
  - Speed reduction
- Drone Radar
  - Speed reduction for vehicles with radar detectors
- Uniformed Law Enforcement Officers
  - Deter speeding or aggressive driving and improve driver alertness
- Temporary rumble strips
  - Alert and re-focus distracted or drowsy drivers

20

How Can It Be Used

- Portable Traffic Signals
  - Removes human flaggers from dangerous roadside positions
- Automated flaggers Assistance Devices
  - Minimize flaggers' direct exposure to traffic
- Reduction of channelizing device spacing
  - Increase driver alertness and possible speed reduction by motorist
- Intrusion alarms
  - Warns work crew and errant vehicle drivers
- Directional Indicator Barricade
  - Directs drivers into the intended travel lane

21

How Can It Be Used

- Traffic or "Gawk" Screens
  - Used in California to block motorist's view of work activities
  - Discourage gawking
- Portable Concrete Traffic Barrier
- Temporary Movable ("Zipper") Barrier
- Additional Truck Mounted Attenuators

22

When to Address It

- Preconstruction Safety Meeting
  - TxDOT, prime contractor, subcontractors, utility companies, and law enforcement entities
  - Allows an opportunity to review the traffic control plan
  - Encourage ideas to make work zone traffic control more effective
  - Be open to ideas to enhance safety on project
- Regular scheduled safety meeting
- Contractor safety meeting (Daily/Weekly)

23

Benefits of Safety Contingency

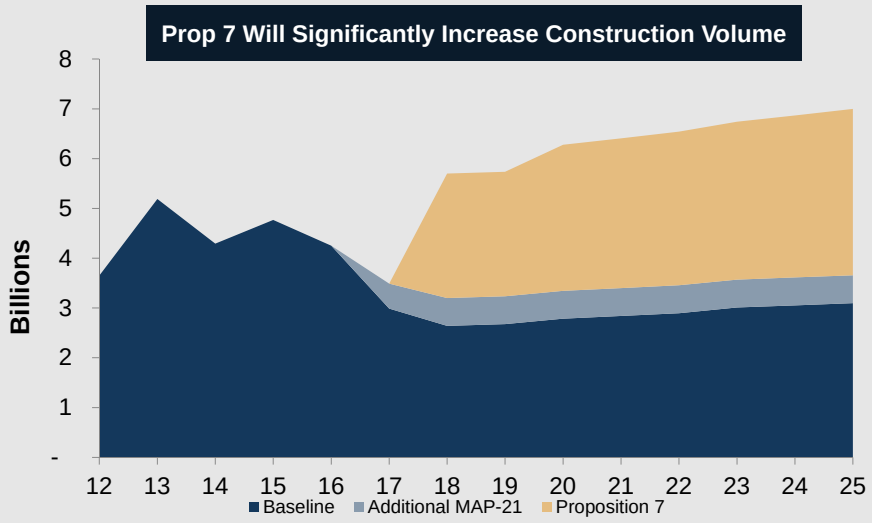
- The Safety Contingency is a great tool to expedite the implementation of safety enhancements on our projects
- Funds are set aside for safety related project needs
  - Elimates budgetary concerns
- Encourage new ideas
- Encourage new enhancements to traffic control

24

Questions?

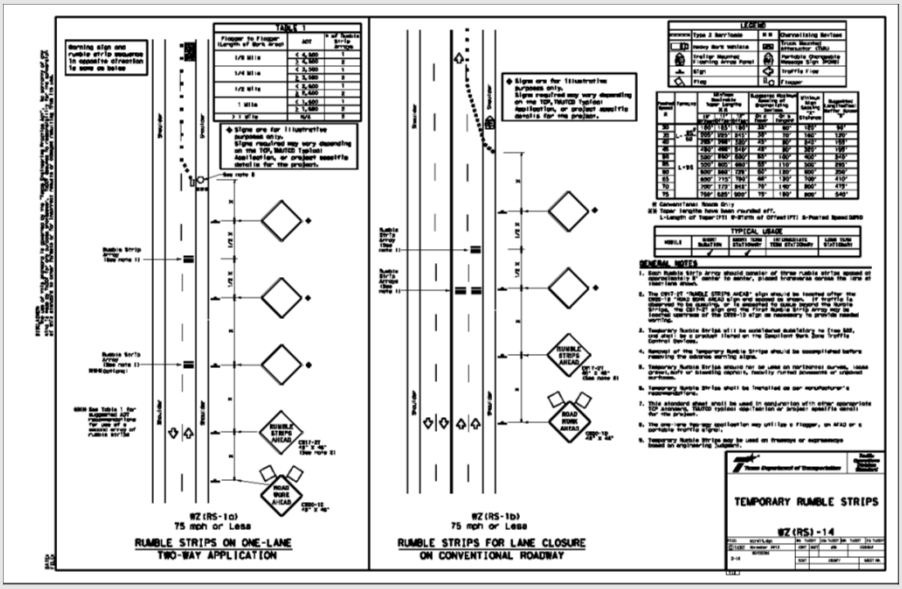
25

Construction Volume



26

Standard


WZ(RS-1a)
75 mph or Less
RUMBLE STRIPS ON ONE-LANE
TWO-WAY APPLICATION
WZ(RS-1b)
75 mph or Less
RUMBLE STRIPS FOR LANE CLOSURE
ON CONVENTIONAL ROADWAY
TEMPORARY RUMBLE STRIPS
WZ(RS)-14

27