

THE CENTER FOR TRANSPORTATION RESEARCH
THE UNIVERSITY OF TEXAS AT AUSTIN

TXDOT RESEARCH PROJECT 0-6640
STATE OF THE PRACTICE FOR WORKERS IN VERY SHORT
DURATION WORK ZONE OPERATIONS

Educational Module

July 17th 2012, 10am-3pm

Agenda

Time	Topic
10:00 am – 10:30 am	Pre-workshop Assessment
10:30 am – 11:00 am	PART I: What should be considered as VSDOs?
11:00 am – Noon	PART II: Why is risk assessment important for VSDOs?
Noon – 1:00 pm	Lunch Break
1:00 pm – 2:30 pm	PART III: How to make better judgments in VSDOs?
2: 30 pm – 3:00 pm	Recap & Post-workshop Assessment

Objectives of the Educational Module

After finishing this module, you will know

- **WHAT** should be considered as *Very Short Duration Operations (VSDOs)*
- **WHY** is risk assessment important for *VSDOs*
- **HOW** to properly assess risk and make better judgments in *VSDOs*

Content

PART | What should be considered as VSDOs?



Current Common Classifications of Work Zone Operations

Guidance provided by MUTCD and TxDOT policies:

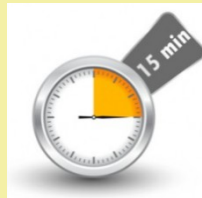
- Long-Term Stationary – Work that occupies a location more than 3 days.
- Intermediate-Term Stationary – Work that occupies a location from overnight to 3 days.
- Short-Term Stationary – Daytime work that occupies a location for 1 to 12 hours.
- Short Duration – Work that occupies a location up to 1 hour.

Definition of Very Short Duration Operations

A planned or urgent activity, to be executed in 15 minutes or less by a crew of, one man and one truck or more, and the hazard of not executing the work as a very short duration operation is greater than executing it.

Currently very little guidance is provided.

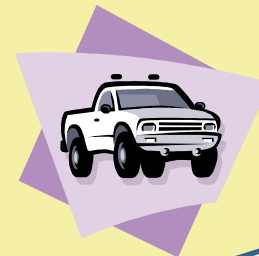
- ✓ 15 minutes or less



- ✓ Not executing is more dangerous than executing



- ✓ Usually one man and one truck



Maintenance Pick-up Truck



Signal Lights



Bumper



Portable Message Sign



Fire Extinguisher & First Aid Kit

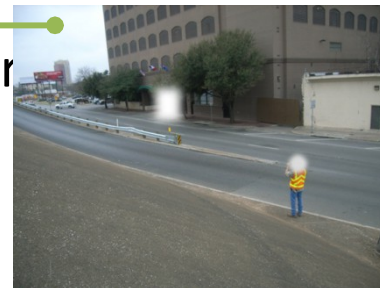


Cones and other tools



Typical VSDOs

- ✓ Temporary pothole patching
- ✓ Debris removal
- ✓ Signal light replacement in rural areas
- ✓ Edge patching – edge of travel lane at short length
- ✓ Delineator maintenance on the side of the road
- ✓ Warning sign placement
- ✓ Supervisor markings for future work
- ✓ Taking photographs
- ✓ Setting up traffic counters
- ✓ Data collection/surveys



Temporary pothole patching



Removing Tire Scraps from the Shoulder



Warning sign placement



Taking photographs



Activities NOT considered as VSDOs

Short duration and mobile maintenance operations such as

- × crack sealing
- × herbicide application
- × mowing/brush cutting
- × raised pavement marker replacement
- × snow and ice control
- × striping
- × sweeping
- × guardrail work
- × lighting maintenance
- × paving operations
- × signal work
- × sign repair and installation

Q: Should the following activities be considered as VSDOs? Why?

Scenario A: Removing a dead cow from a shoulder

Yes or **No**

Scenario B: Repairing a damaged guardrail during rush hour

Yes or **No**

Scenario C: Picking up multiple objects on freeway exit ramp

Yes or **No**

Answer:

Scenario A: Removing a dead cow from a shoulder

Answer: **Yes/No** depending on

- The size of the cow
- Available equipment and workers
- Hazard to the traffic



Answer:

Scenario B: Repairing a damaged guardrail during rush hours

Answer: **No.** Usually repairing a damaged guardrail

- Takes more than 15 minutes
- Requires special maintenance workers and equipment (contracted out)
- The hazard of executing the work is greater than not executing

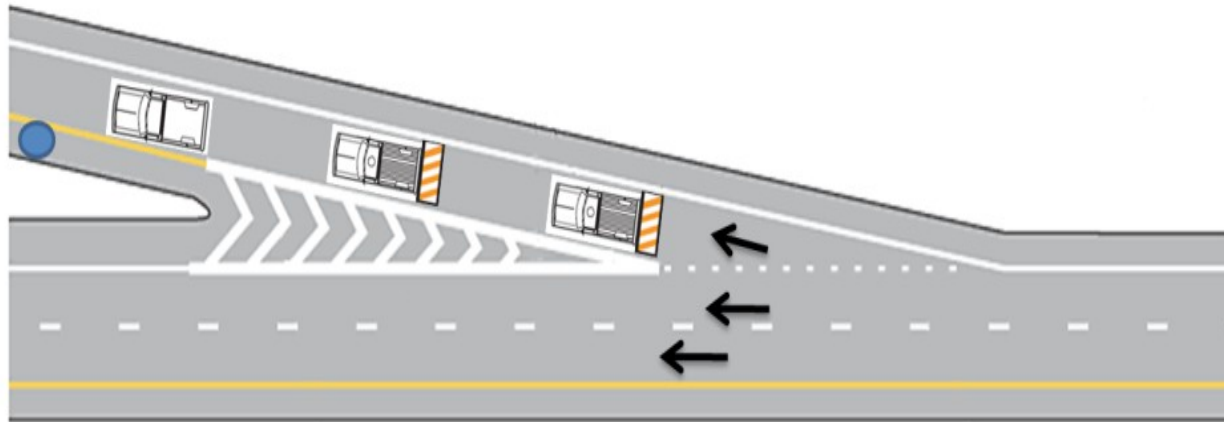
* Taking pictures of the damaged guardrail or setting up a warning sign can be considered as a VSDO.

Answer:

Scenario C: Picking up multiple objects on freeway exit ramp

Answer: **No**. Usually picking up multiple objects on freeway exit ramp

- Requires temporary traffic control devices (e.g. truck-mounted attenuators)

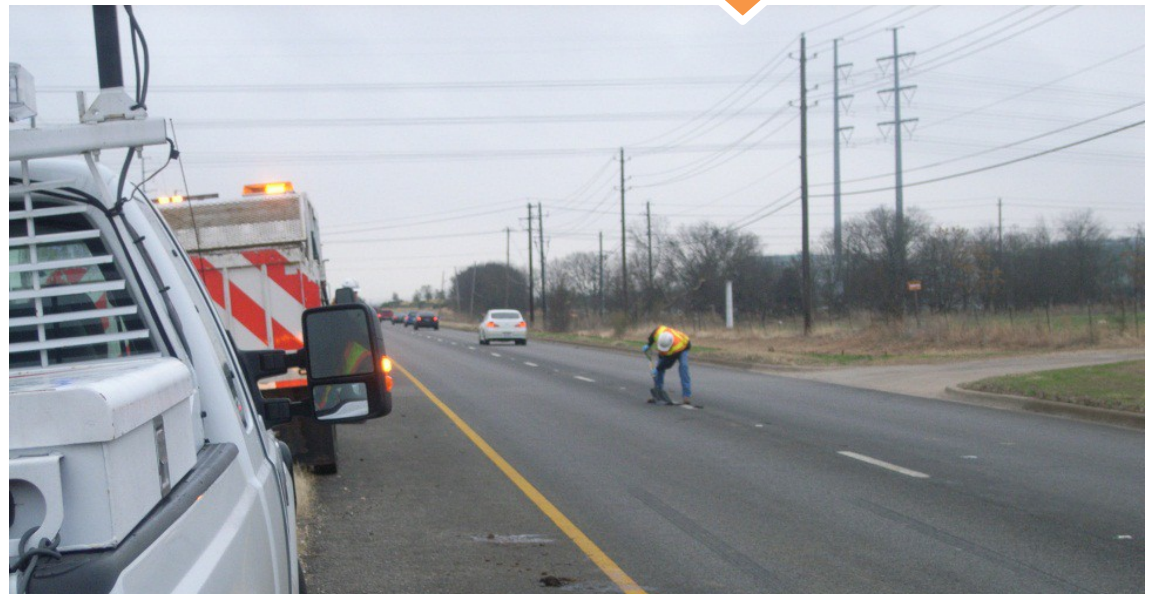


PART II Why is risk assessment important for VSDOs?



Some Safety Pitfalls:

- “Nothing will happen in 2 minutes.”
 - Visibility distance?
 - Traffic speed? Traffic volume?
- “The drivers will notice my vehicle.”
 - Visibility distance of the driver?
 - Stopping distance?
- “I will be able to escape before the vehicle approaches.”
 - Place of refuge?
 - Available time?



Examples of risky behavior (based on real events):

An eye-witness account describes a maintenance worker patching some pavement failures on an urban roadway. The worker is alleged to have parked on the shoulder and when there was no oncoming traffic would dart out into a travel lane with a shovel, dump patching material and dash back to the shoulder.



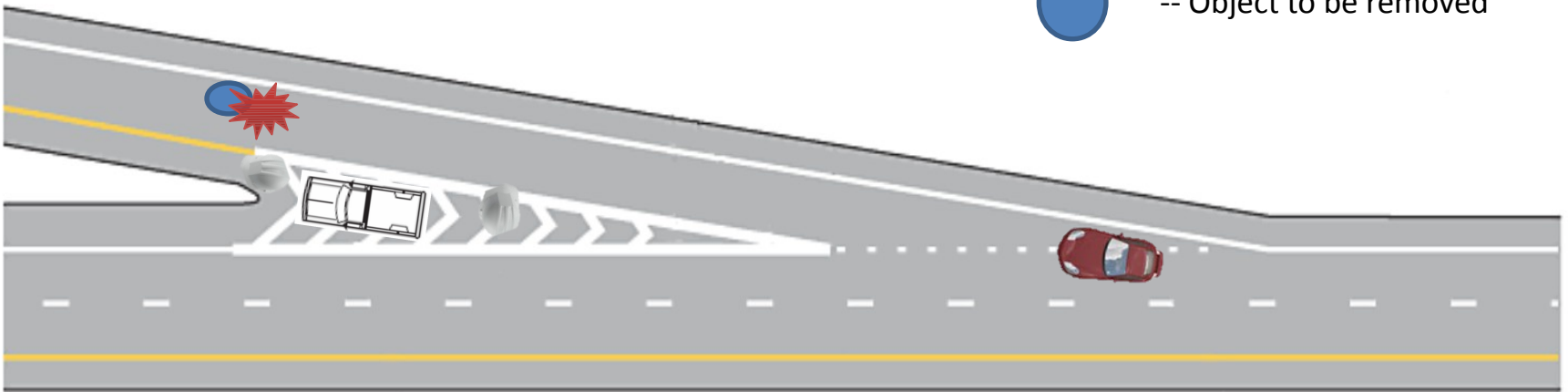
Examples of risky behavior (based on real events):

A maintenance worker was killed while trying to remove a dead dog on a freeway ramp. Despite the worker having a spotter to watch for oncoming traffic, the worker ran in the same direction as the vehicle when the spotter yelled at the worker.

Whose fault? The worker? The driver?

-- Maintenance worker

-- Object to be removed



Performing VSDOs can be very risky due to

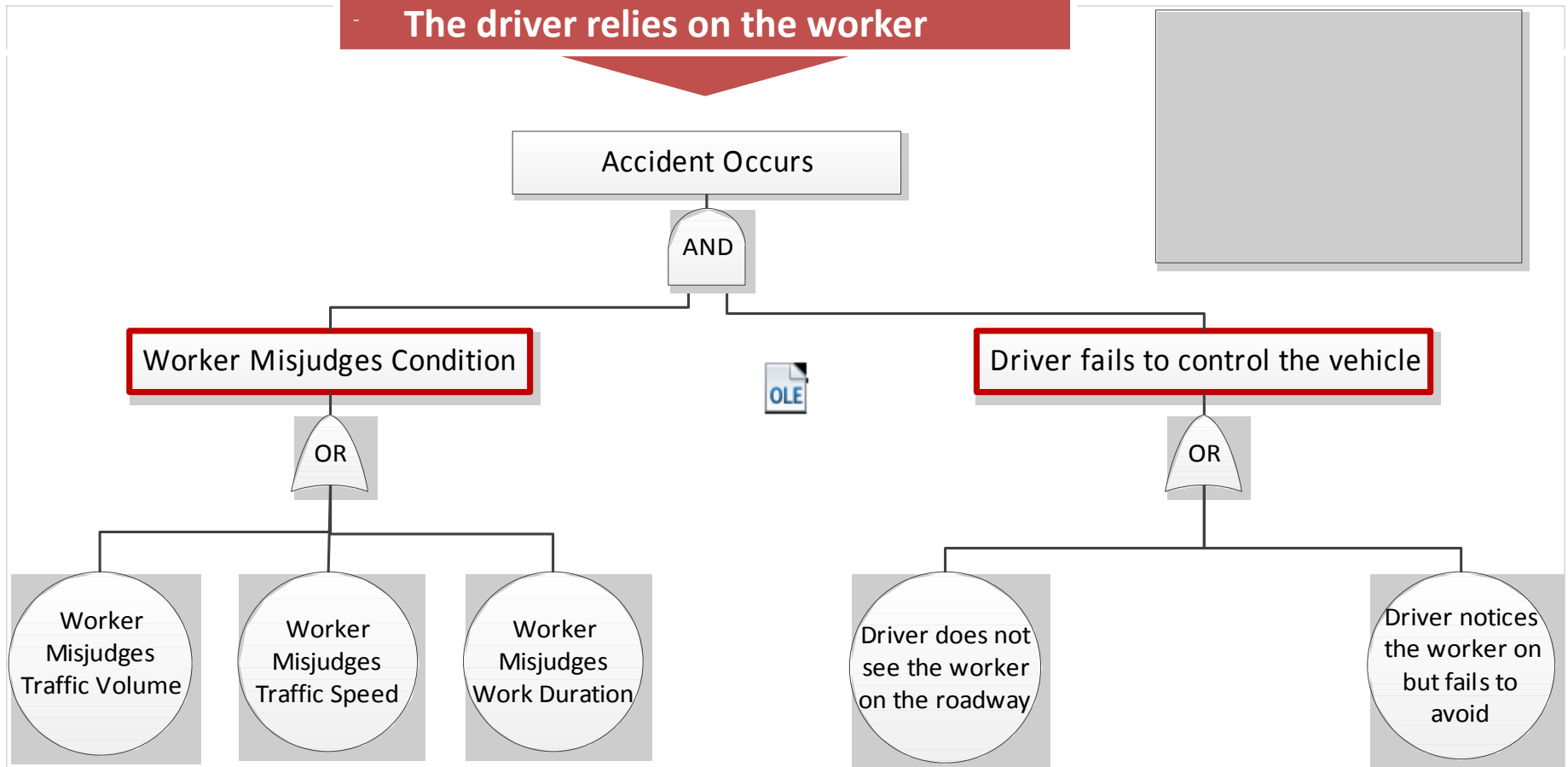
- Limited time for decision making
- Negligence of the maintenance workers
- Limited traffic control devices
- Ambiguous scope of the work zone
- Unpredictable conditions (e.g. traffic speed/volume, tasks and weather)
- **Largely depends on workers' judgments !**

Accidents are likely to occur in case of poor judgments.

Causes that might lead to accident occurrence in a VSDO

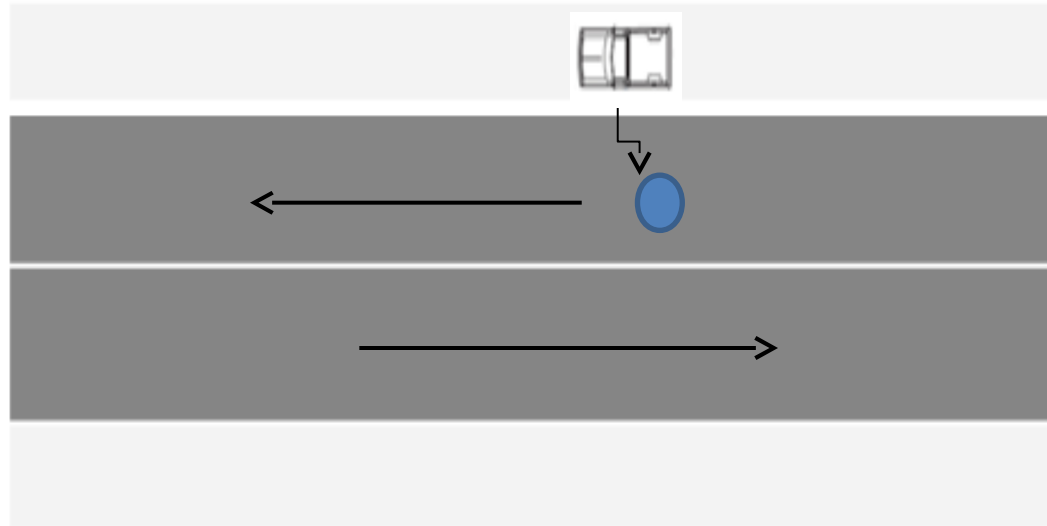
String of bad judgments

- The worker relies on the driver
- The driver relies on the worker



Example : Removing Tire Scraps from the Roadway

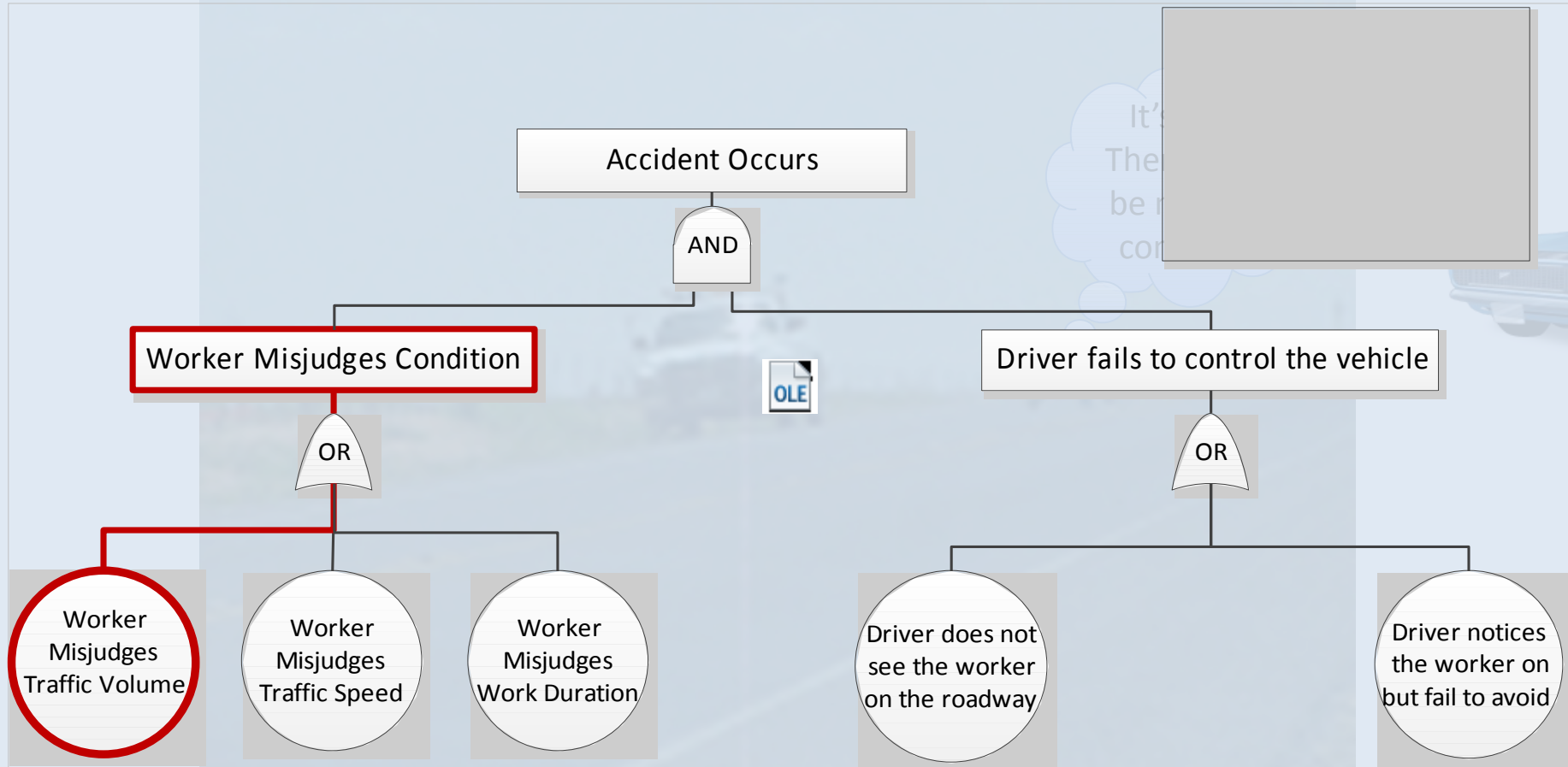
Duration: Less than a minute



Roadway geometry	Two lane rural road, level and straight
Location of work	On the travel-way
Where do they locate their vehicle?	On the shoulder
Traffic control devices	Truck-mounted Flashing light bars
Traffic control procedures	A maintenance worker walked out of the truck and removed tire scraps from a road way
Safety precautions	N/A

Example : Removing Tire Scraps from the Roadway

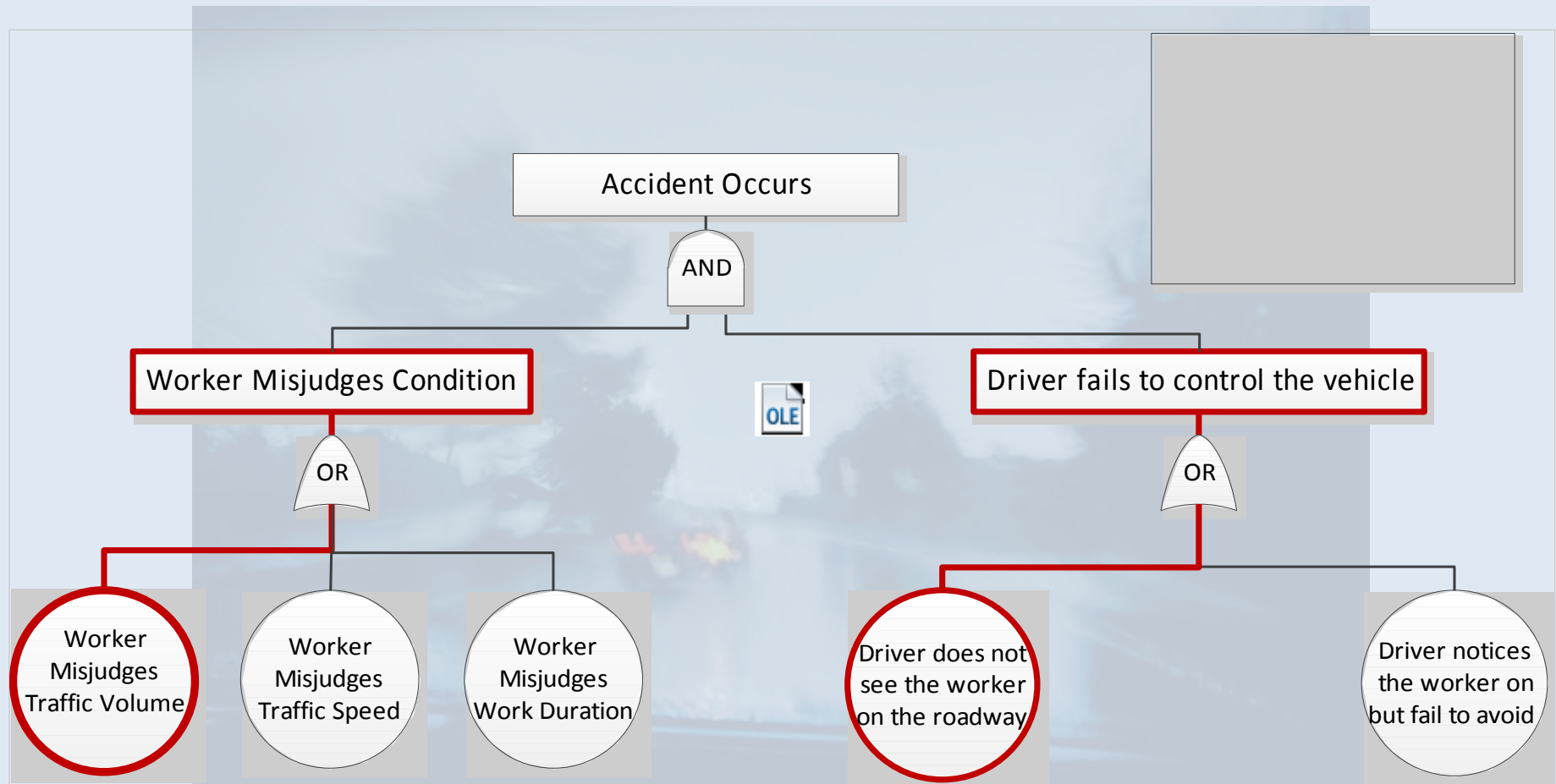
- From the worker's viewpoint -



What are the possible reasons that might lead to bad judgments?

Example : Removing Tire Scraps from the Roadway

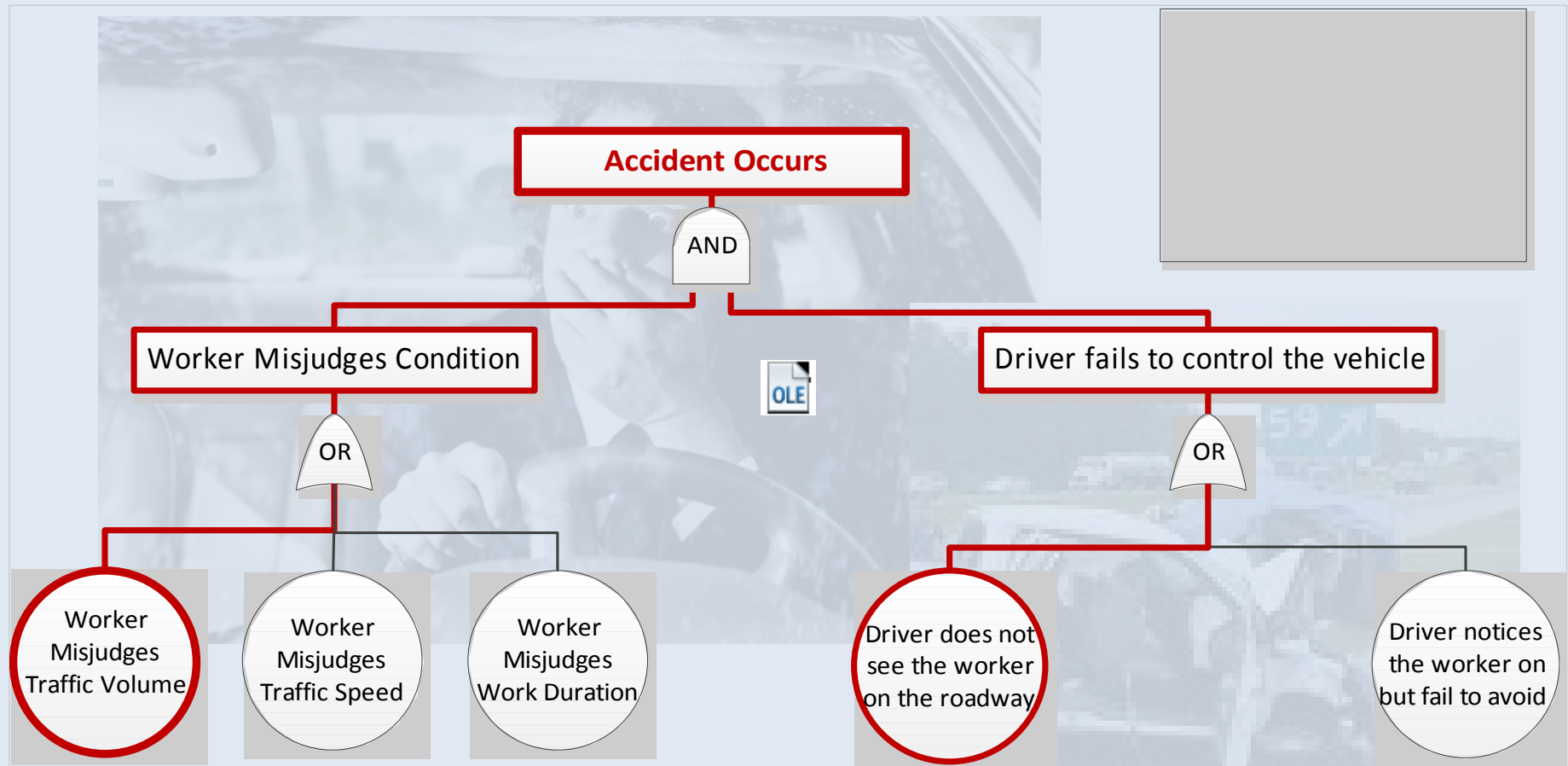
- From the driver's viewpoint -



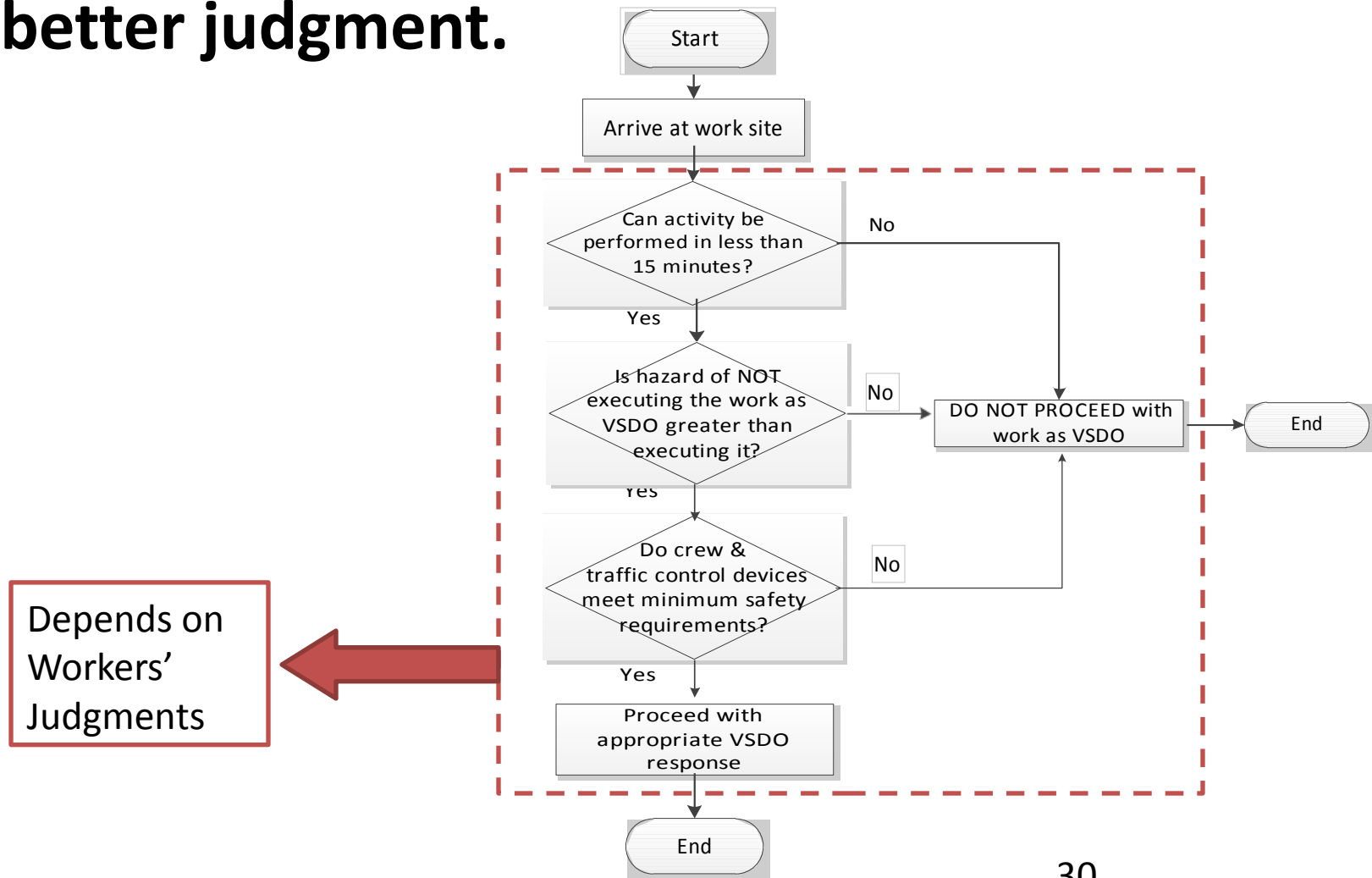
In what conditions would the drivers fail to control their vehicles?

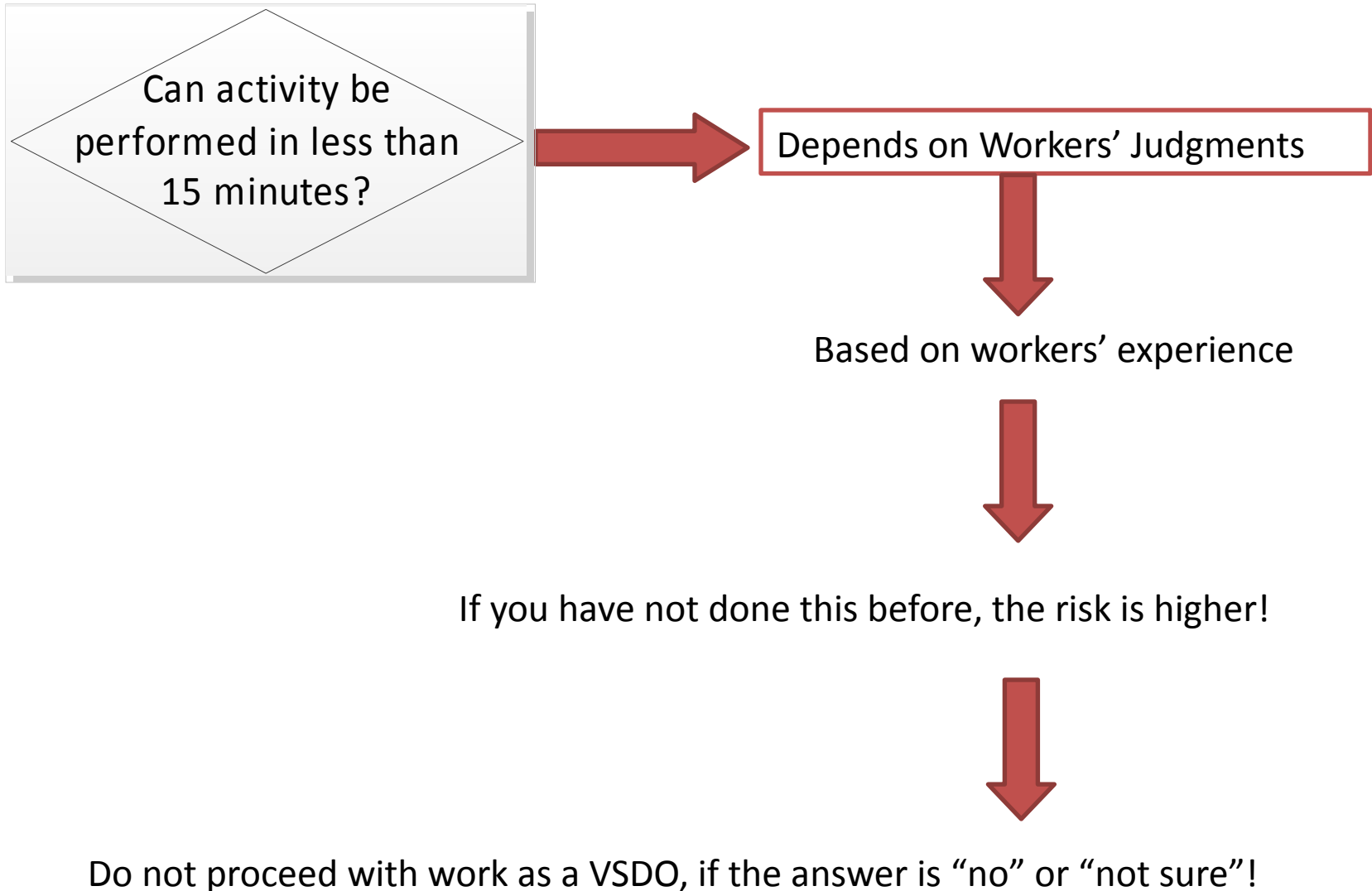
Example : Removing Tire Scraps from the Roadway

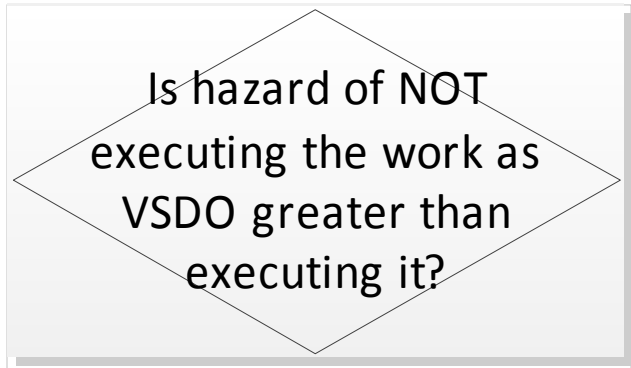
- Accident-



It is important to have a streamlined risk assessment process to ensure efficient and better judgment.







Depends on Workers' Judgments



Is this work have to be done right now?



How dangerous it is to you if you perform the work?

How dangerous it is to the public if you do not perform the work?



If it is dangerous to you, do not proceed with work as a VSDO!
If it is dangerous to the public, ask for assistance!

Do crew &
traffic control devices
meet minimum safety
requirements?

Minimum Safety Requirements:
One truck, one worker
Truck should have a high intensity light bar

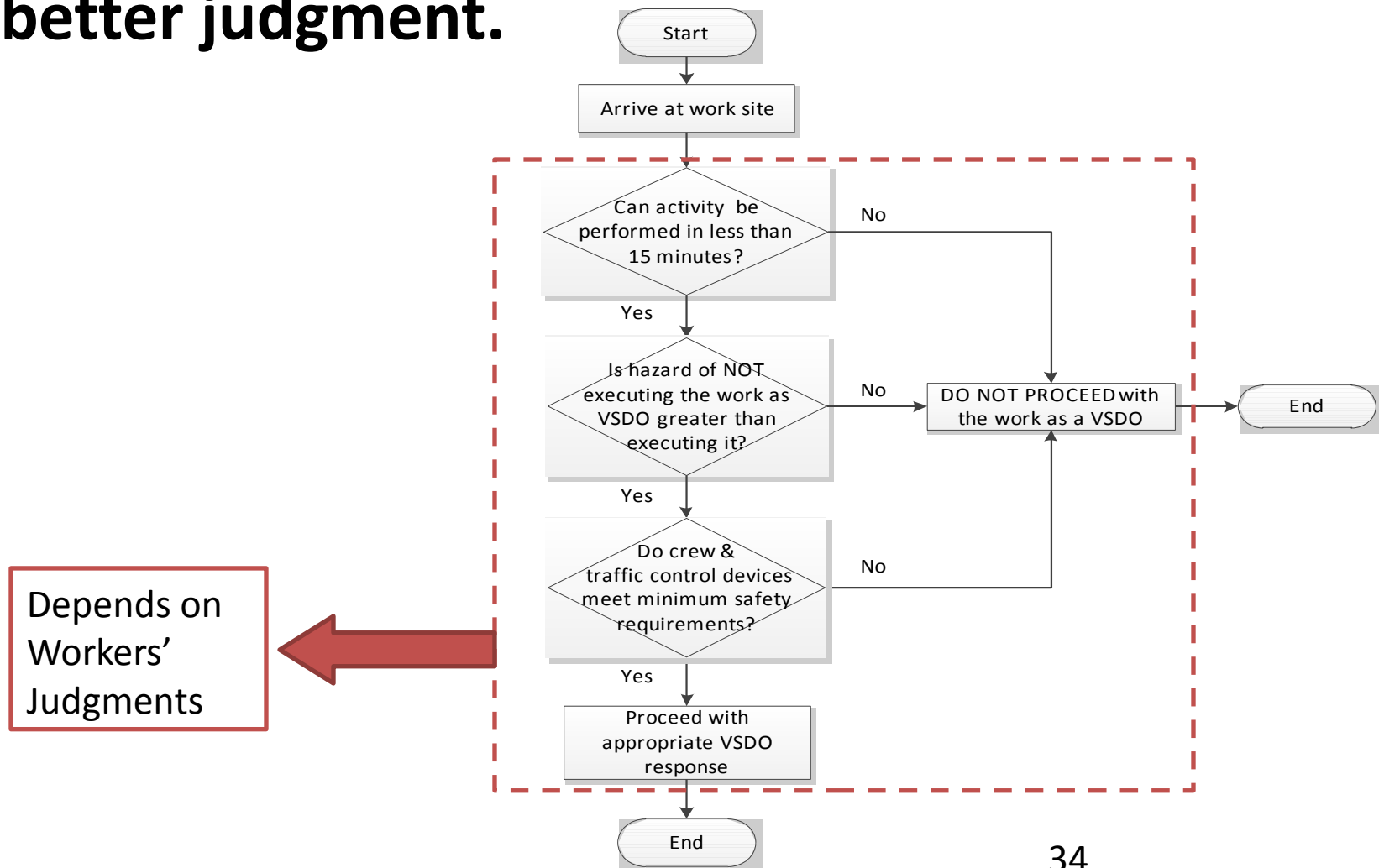
Depends on Workers' Judgments

Do you need a spotter? Do you have one?

Do you need additional equipment to perform the work?

If you do not have everything you need, do not proceed with work as a VSDO!
Ask for assistance!

It is important to have a streamlined risk assessment process to ensure efficient and better judgment.



II

Q: What are the potential causes for poor judgment in the following accident? What would you do differently?

Accident in Fall 2009 - Less than 15 minutes, 1 lane on an exit ramp, uphill, no curves, clear, dry, sunny, strobes on and mounted sign that said "Use Caution To Pass" speed limit = 65, ADT = 6900, employee was going to back up and pull off the road to patch a pot hole, would have been in the open lane with another employee to flag, employee was going slow and vehicle got inside his mirrors, employee started to back up and hit the vehicle.

II

Q: What are the potential causes for poor judgment in the following accident? What would you do differently?

Accident in Fall 2009 - less than 15 minutes, 2 lane roadway, some curves and hills, dry, cloudy, strobes on and sign on truck that said "Use Caution To Pass" speed limit = 55, ADT = 2100, employee would have been in open lane with other employee to flag, employee was going slow and vehicle got behind him inside of his mirrors, employee started to back and hit the vehicle. employee should have turned around and pulled off the road to patch the pot hole.

PART III

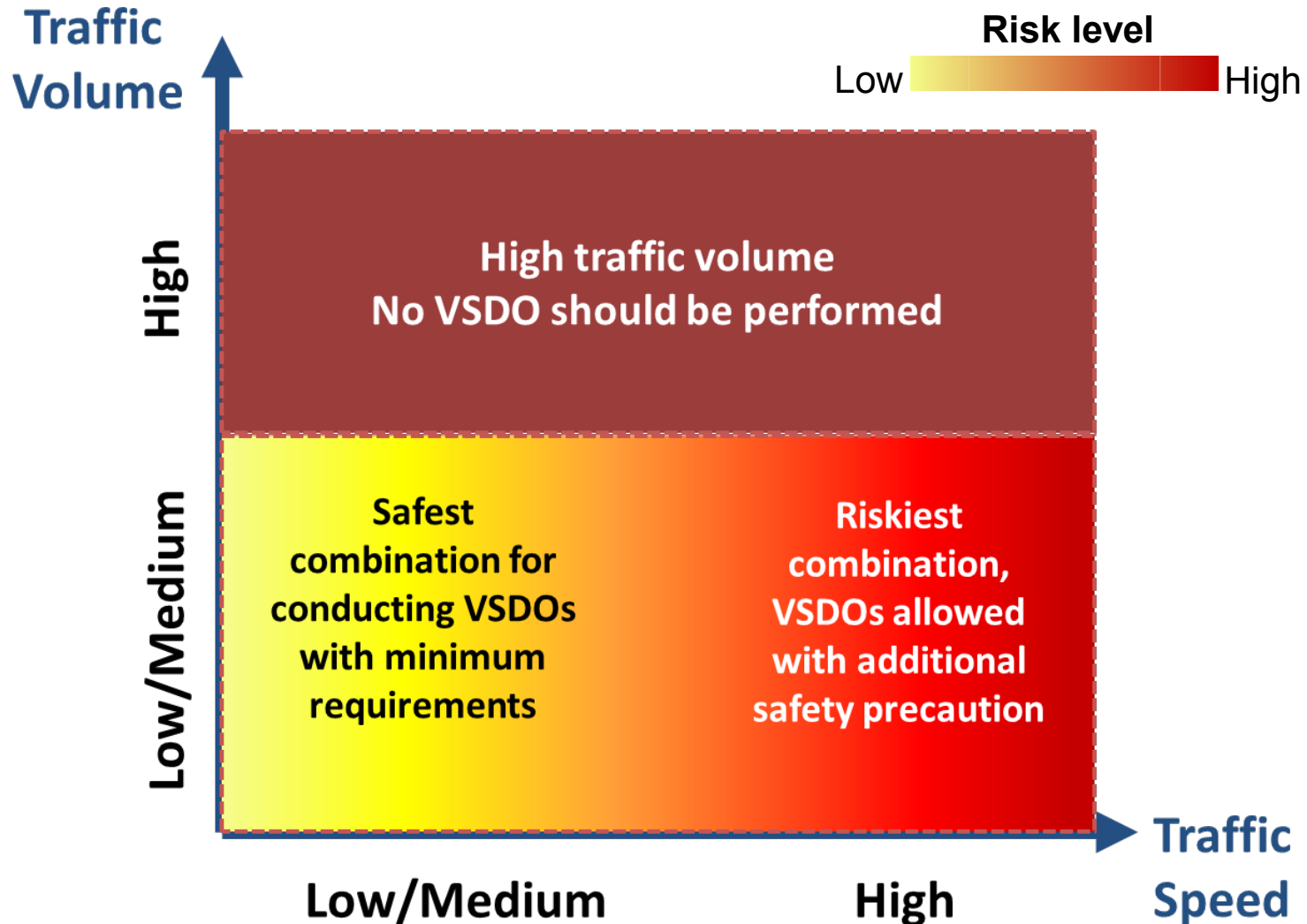
How to make better judgments in VSDOs?



Influencing Factors

- Factors that will increase the probability of accidents during Very Short Duration Operations (VSDOs)
 - Limited visibility (e.g. foggy/rainy weather, night and curves)
 - Icy pavement
 - Medium/low traffic volume and high traffic speed

Risk Judgment Matrix



Most Common Scenarios in VSDOs

- Scenario I – Typical VSDOs on a travel-lane

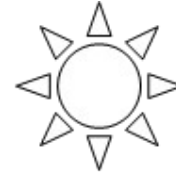
Minimum requirements:

- One truck, one worker

- Truck should have a high intensity light bar

Where to park the maintenance vehicle?

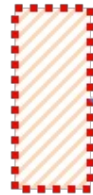
- On the shoulder



Weather condition: Clear
Pavement condition: Dry

Traffic volume: Low

Traffic speed: Medium



Location of work: Within a travel lane

Availability of refuge:
Shoulder

Most Common Scenarios in VSDOs

- Scenario I – Typical VSDOs on a travel-lane

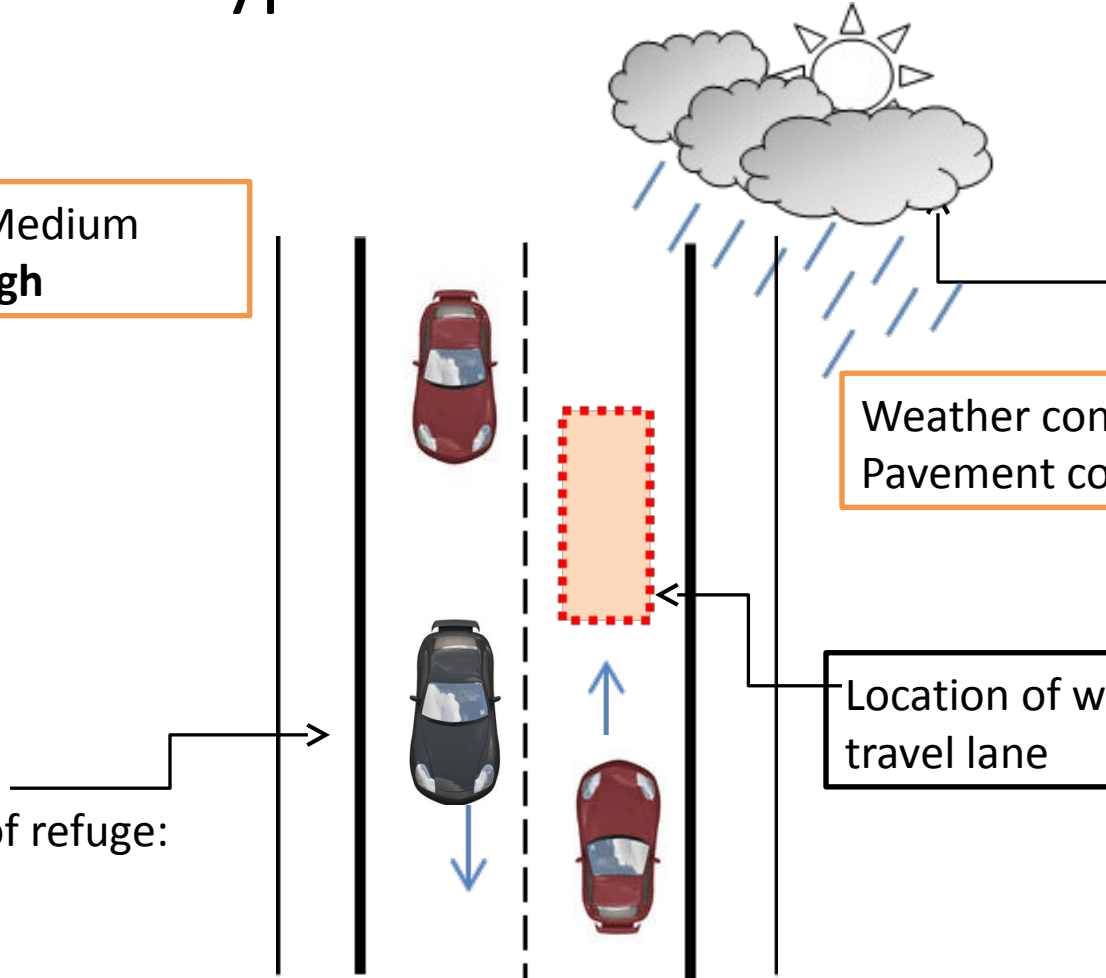
What if?

Traffic volume: Medium
Traffic speed: High

Availability of refuge:
Shoulder

Weather condition: Rainy
Pavement condition: Wet

Location of work: Within a
travel lane



Most Common Scenarios in VSDOs

- Scenario II - Typical VSDOs on a shoulder

Weather condition: Clear
Pavement condition: Dry



Traffic volume: Low
Traffic speed: Medium

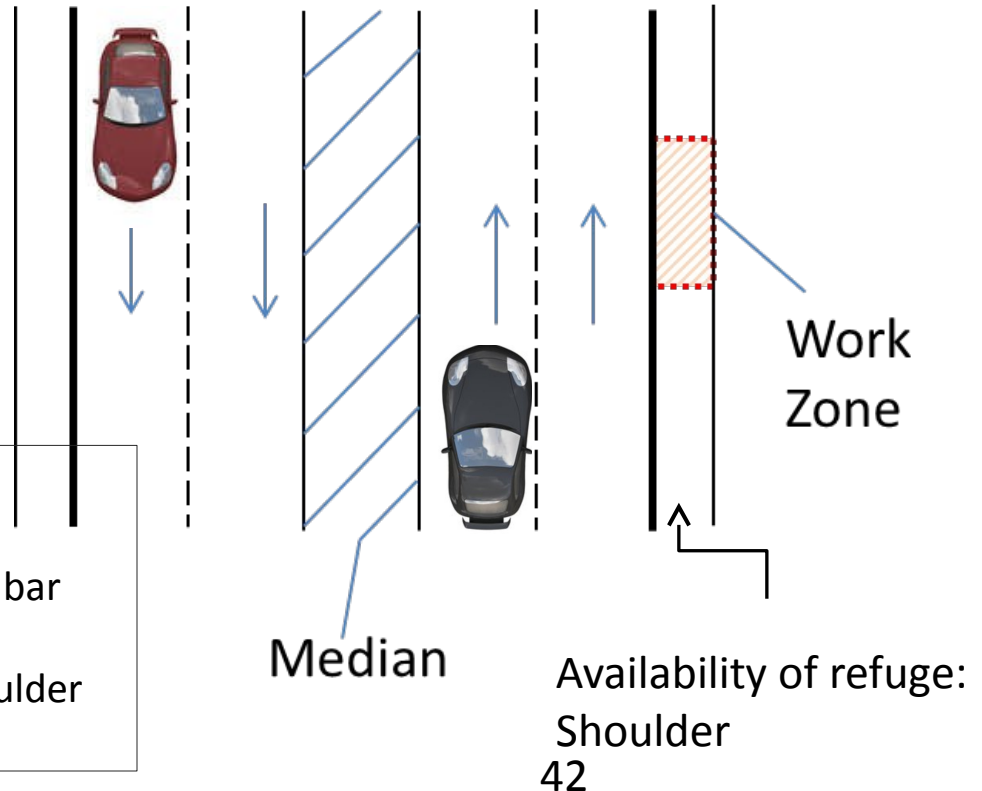
Minimum requirements:

One truck, one worker

Truck should have a high intensity light bar

Where to park the maintenance vehicle?

Parking location can be either on a shoulder or a median



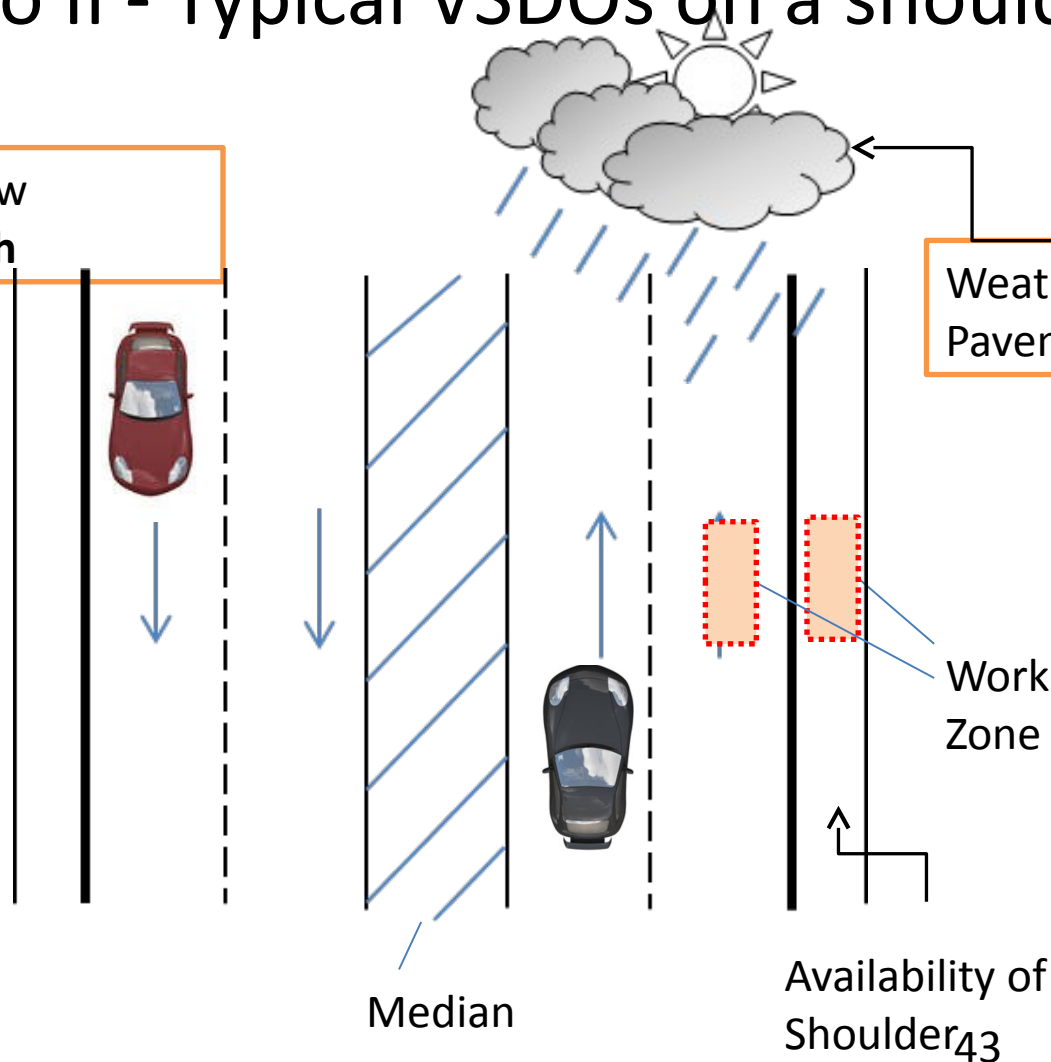
Most Common Scenarios in VSDOs

- Scenario II - Typical VSDOs on a shoulder

What if?

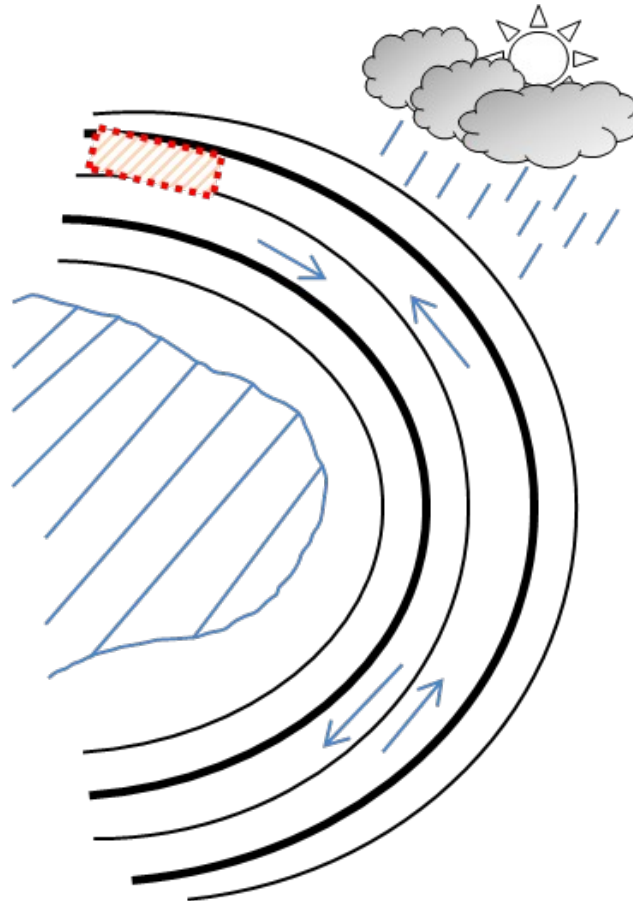
Traffic volume: Low
Traffic speed: High

Weather condition: Rainy
Pavement condition: Wet



Scenario A

Q: Please identify the risk factors that need be considered during the decision making process



Answer: Scenario A – VSDOs with vision blocking geometry

1) Location of work: Within a travel lane and after a curve

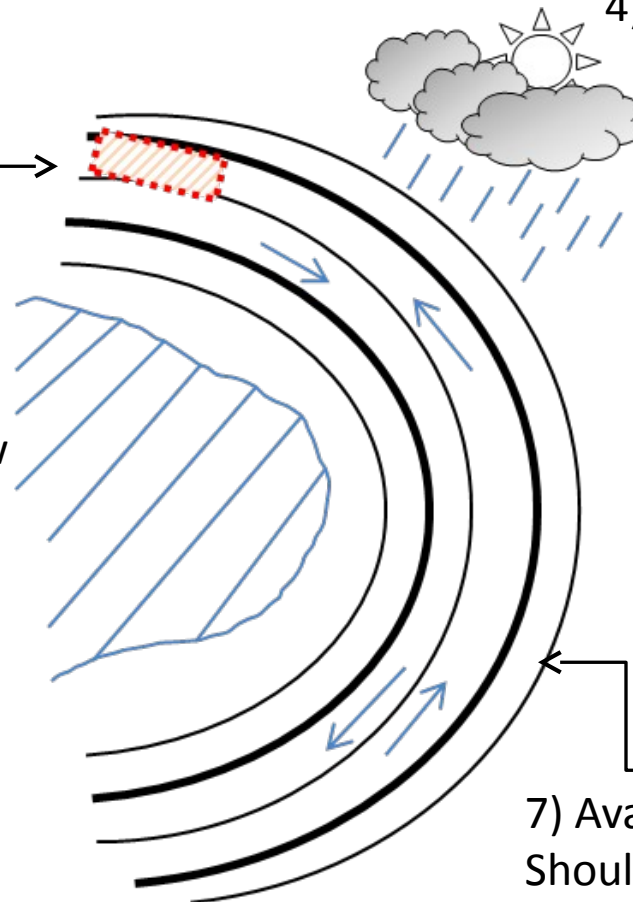
2) Weather Condition: Rain/ fog

3) Pavement condition: wet

4) Limited visibility

5) Traffic volume: Medium/low

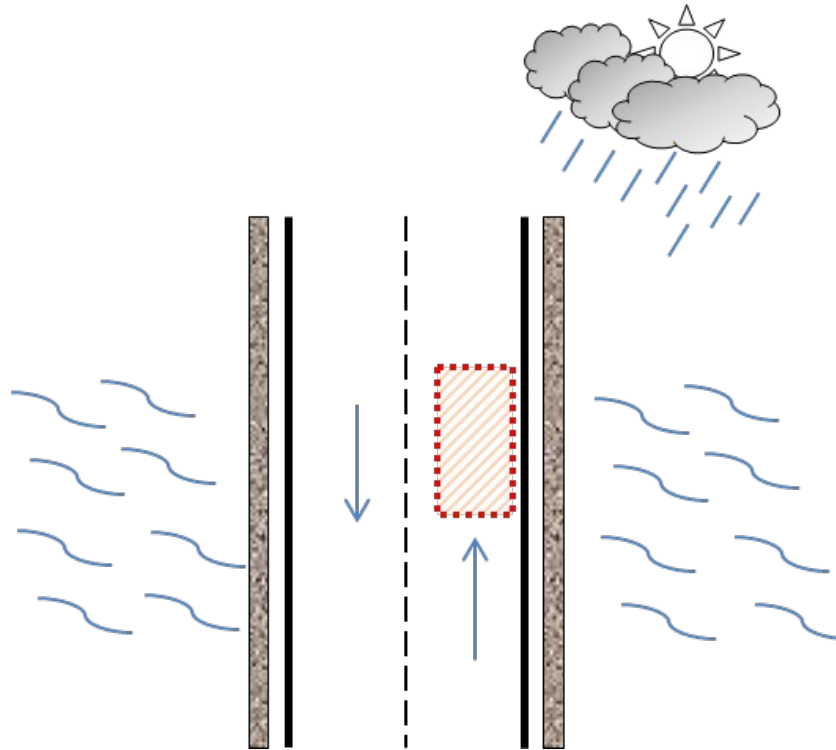
6) Traffic speed: High



7) Availability of refuge:
Shoulder 45

Scenario B

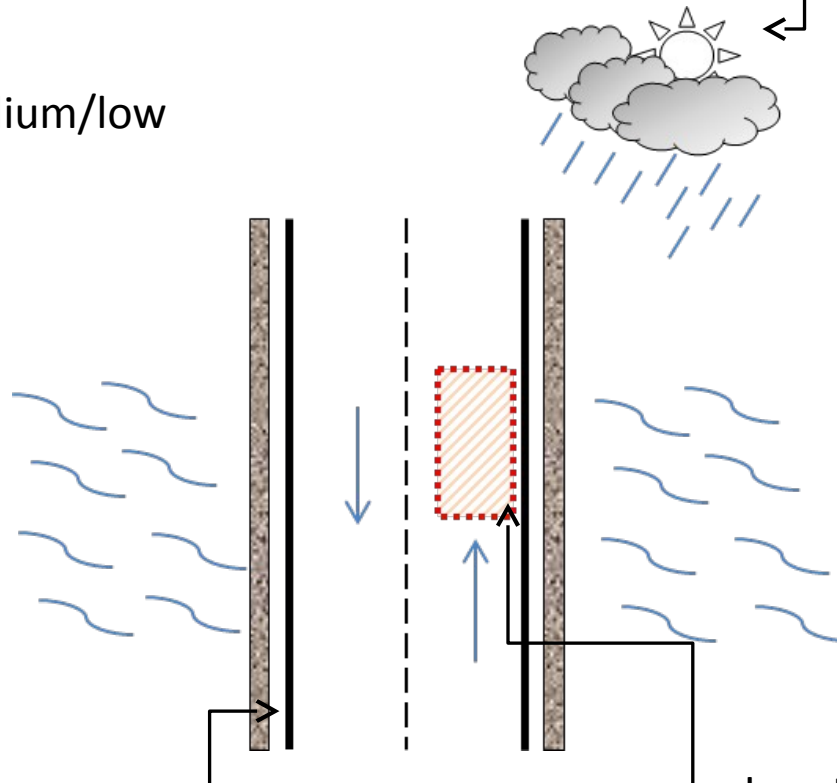
Q: Please identify the risk factors that need be considered during the decision making process



Answer: Scenario B – VSDOs without places of refuge

Traffic volume: Medium/low
Traffic speed: High

Weather Condition: Rain/ fog
Pavement condition: wet
Limited visibility

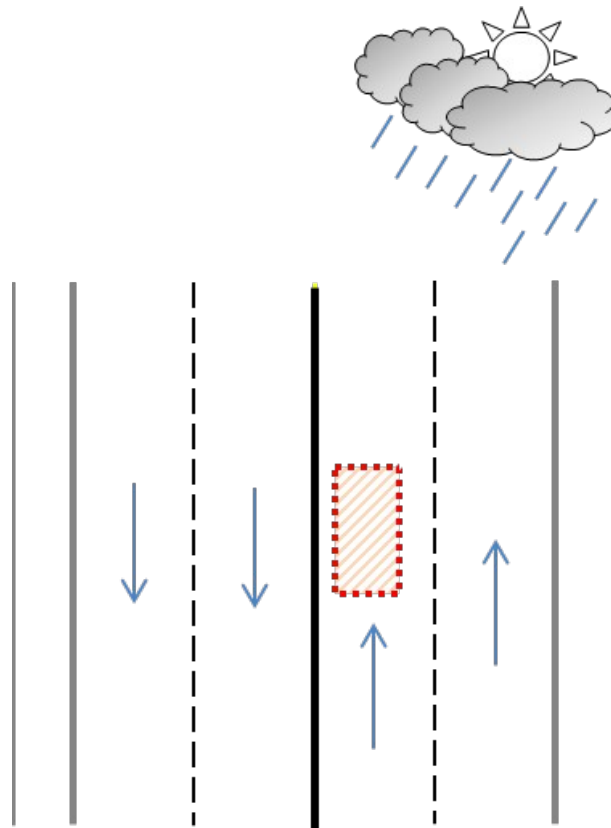


Availability of refuge:
None, **a bridge without a shoulder**

Location of work: Within a travel lane and **on a bridge**

Scenario C

Q: Please identify the risk factors that need be considered during the decision making process



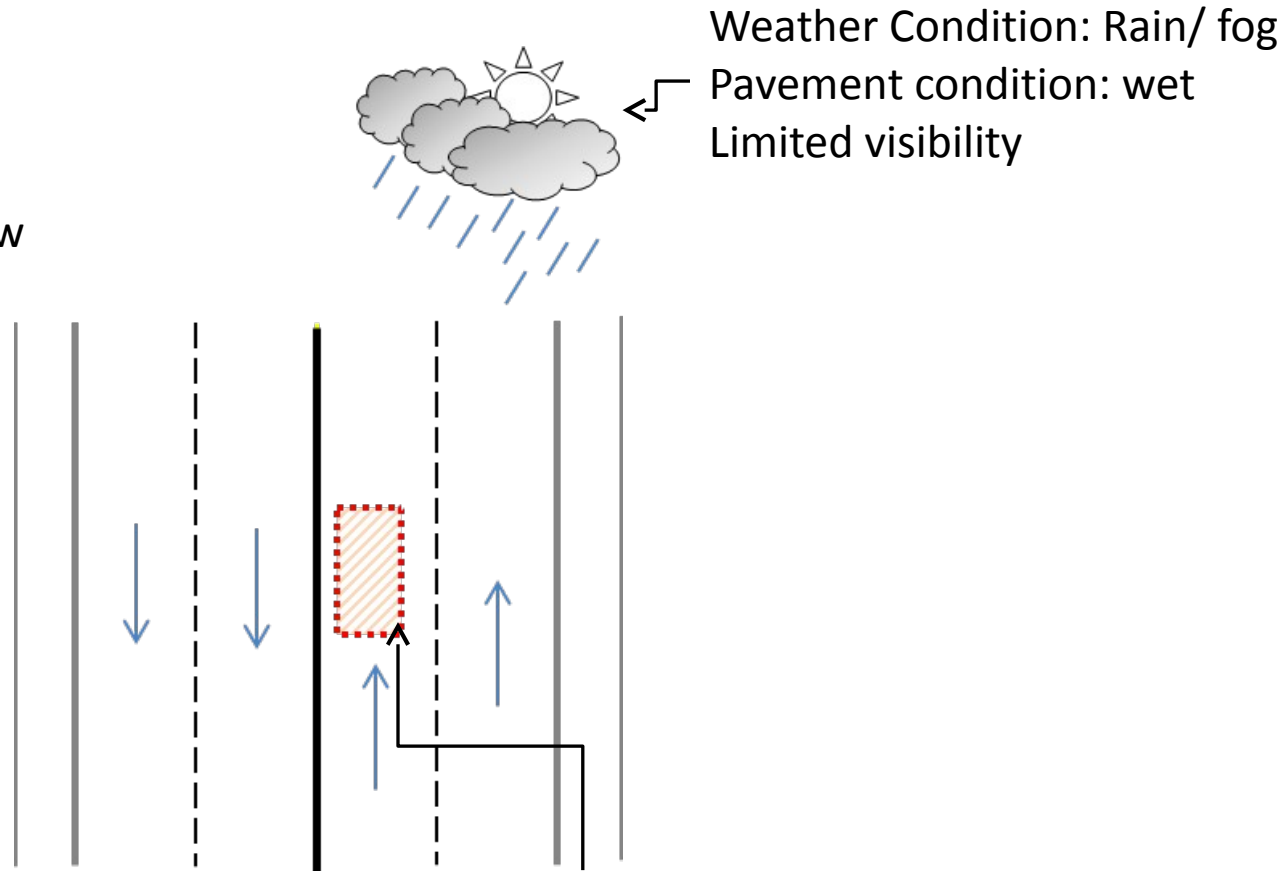
Evaluation

PART III How to make better judgment in VSDOs?

Answer: Scenario C – VSDOs on multilane roadway without a median

Traffic volume: Medium/low
Traffic speed: High

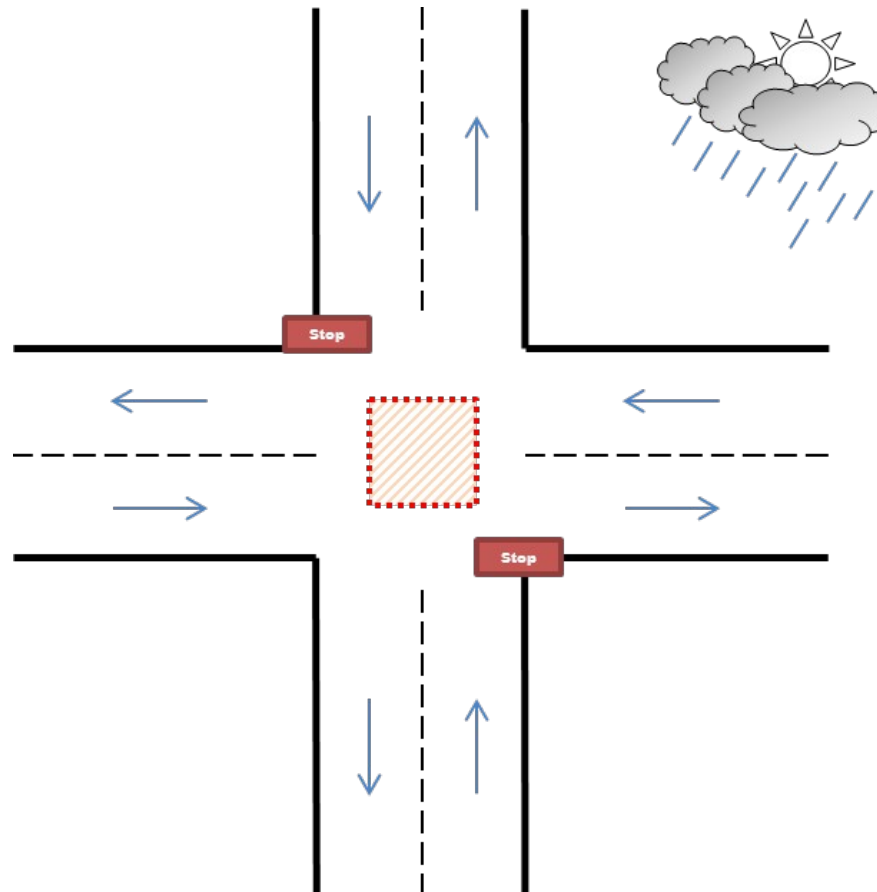
Availability of refuge: None,
Multilane roadway
without a median



Location of work: Within a travel lane

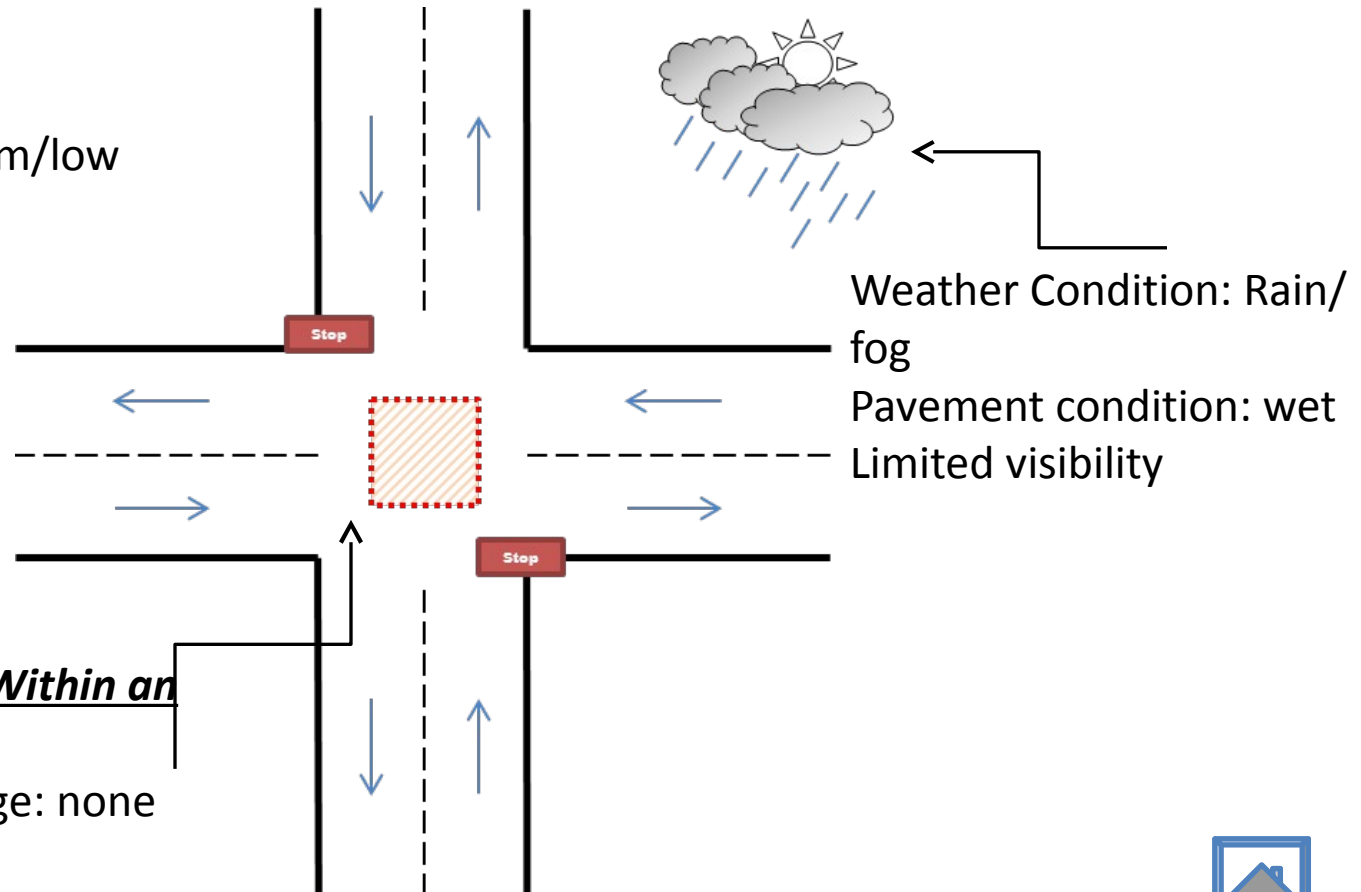
Scenario D

Q: Please identify the risk factors that need be considered during the decision making process



Answer: Scenario D – VSDOs at intersection with two-way roads

Traffic volume: Medium/low
Traffic speed: High



Location of work: **Within an intersection**
Availability of refuge: none

recap



THINK before you work!

- **Whether you should proceed with work as a VSDO?**
 - 15 minutes
 - One maintenance worker and one truck
 - Not executing the work is more dangerous than executing
- **Accidents are usually caused by a string of bad judgments**
- **Factors that will increase the probability of accidents during Very Short Duration Operations (VSDOs)**
 - Limited visibility (e.g. foggy/rainy weather, night and curves)
 - Icy pavement

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Think safe! Work safe!