

# Conducting MVI Investigations

## Step 1: Respond to the Incident

If he or she is able to do so, your employee(s) at the crash scene should immediately:

1. Check themselves for injuries
2. Secure the scene and take steps to ensure further harm does not occur (e.g., control traffic)
3. Provide all reasonable care for people who may have been injured
4. Contact, or have someone else contact 911 to alert emergency responders
5. Notify his/her supervisor or employer
6. Begin collecting information (see below)

As soon as they are aware of the crash, the designated manager should confirm emergency resources have been mobilized. They must then decide (and/or check the company's policy) if they will send a company representative to the crash scene. If a company representative attends the scene, upon arriving they should:

1. Verify the scene is safe and secure to avoid disturbance of information
2. Assist in providing all reasonable care, if necessary
3. Begin or assist with collecting information
4. Cooperate with enforcement officers and emergency responders
5. Initiate reporting the incident to authorities (e.g., police, insurance company, WSIB, MOL or ESDC)

A quick and effective response is the best way to prevent further injury or harm and avoid additional losses. It's part of your due diligence.

## Step 2: Gather Information

The main purpose of gathering information is to establish facts that describe the sequence of events that occurred before, during and after the crash. Clear and complete information enables investigators to re-create events with accuracy, and understand what happened. Crash scenes can be chaotic so it is important to be



prepared and know what information to collect, and how to collect it. To ensure your employees know what to do if they are involved in a crash, download *If You're Involved in a Crash Checklist*. Keep a copy in all work vehicles.

Download the MVI Investigation Equipment Checklist for a list of the supplies and tools for collecting and processing crash scene information. Once witnesses leave the scene you might not be able to find them, or they may soon forget what they saw or heard. Start collecting vital information as soon as possible - especially information that may disappear quickly.

There are several methods used to gather information about an incident:

1. Examine the site
2. Take photographs
3. Make sketches
4. Interview people
5. Let modern technology help

### Examine the site

The first thing to do is to survey the scene to identify hazards that have not yet been neutralized - and address or avoid them! Then, identify the pieces of information you need to gather.



Look closely for clues. What looks unusual or out of place? Debris may be scattered over a large area. What do tire tracks tell you? Look inside the vehicle(s). Is it a well-organized workplace or cluttered with items that obstructed the driver? Is there a smartphone with a half-finished text? An open make-up kit? If you think it can help piece the events together, take a photo or make notes.



### Looking for Clues

Each crash can have an array of possible underlying causes. As you examine the scene for information, use the framework below to help ask the right questions.

1. Physical factors – Did mechanical (e.g., unfit vehicle, unsecured load, worn tires), environmental (e.g., weather, road), material (defective traffic control device) or other factors contribute to the crash?
2. Human factors – Did a person (e.g., driver, passenger, pedestrian, supervisor) do, do incorrectly or incompletely or fail to do something that contributed? Were physical or mental conditions (e.g., fatigue, state of mind, skill level) factors?
3. Organizational factors – Do you see or hear things that cause you to wonder if policies or procedures were in place, or that insufficient training, inadequate supervision or improper motivations are factors?

Developing your own initial theory of what happened can guide you to collect necessary information. However, don't let your theory (or anyone else's) blind you to information that will lead you to a correct analysis. Look for facts.



### Take photographs

Photographs are the best way to document information. Below is a list of photos to gather at a crash scene.



1. positions of all vehicles involved
2. inside and outside damage to vehicles involved
3. locations of crash-related debris
4. injuries to any person (get consent of that person before taking photos)
5. position of injured persons (if thrown from the vehicle)
6. eyewitness viewpoints - helps describe what each witness could, and could not, see
7. environmental conditions and physical factors (e.g., a setting sun that impaired visibility, an icy patch of road, an improperly secured load, a defective brake part, etc.)

Suggestions for taking crash scene photos

These days, nearly everybody has a camera on his or her phone. Check with observers to see if they have crash photos they are willing to share.

### Make sketches

Sketches of the crash scene are valuable tools because they convey information that photos usually can't. Start with not-to-scale sketches drawn at the site. Use the measuring tape in your kit to measure distances, or estimate using your paces. Later, use your measurements to build a scale diagram.



### Interview people

Interviews are essential. Sometimes, they are the only way to find out what happened and why. Speak with the people involved in the crash and with those who observed it.

Others may have information about events or circumstances before and after the crash - the supervisor who provided direction, someone the driver spoke with at the last delivery, a motorist or pedestrian who saw this vehicle approach the intersection. Investigations may lead you to seek information outside the workplace. Maybe something that happened this morning at home, at last night's hockey game or some other non-work event has influenced a driver's decisions and actions.



Usually, people involved in a crash didn't see or can't recall everything that happened. Crash witnesses aren't often able to mentally record and recite all of the details. Investigators often have to piece events together using information they discover by interviewing several people.

As you speak with people, seek to determine:

1. When the incident occurred
2. Where they were when it occurred; this will help you understand what they could, and could not see from their vantage point
3. What they saw and heard; their account of what happened and the sequence of events.

Interviewing people is somewhat of an art. Here are a few ideas for eliciting helpful accounts.



- Interview observers as soon as possible. At the crash scene is usually best as long as they are not injured or visibly upset. You can also follow-up and clarify during a later interview.
- Conduct interviews individually and privately, without interference from others.
- Put interviewees at ease. Rather than demanding they "provide their statement for the investigation", ask them to simply describe what happened.
- Ask open-ended questions. Avoid questions that lead the interviewee to guess, or to agree with a suggested occurrence.
- Take the interviewee back through the events by

asking questions like, "What happened next?" or "Was that before or after \_\_\_\_?"

- Consider asking, "Why do you think that happened?", or "What could have been done to avoid this crash?" Such questions can bring out key information, but the associated speculation may or may not be correct.
- Avoid interruptions. If you have questions, wait until the interviewee finishes, then ask.
- During the interview, periodically summarize and repeat it back to the interviewee to make sure you have it right.
- Offer to share your notes or audio recordings with each interviewee to check that you have correctly captured their words.
- Give the interviewee your contact information. Ask them to call if they think of anything else.
- Thank them for their help.



You might encounter interviewees who provide inconsistent, incomplete, incorrect or purposefully misleading information. Sort through their motivations to decide if their statements are of value to the investigation.

### Let modern technology help

Nearly all new cars sold in Canada today are equipped with Event Data Recorders (EDR). Originally designed to help ensure air bags deploy in the event of a crash, today's EDRs track a range of specific data including vehicle speed, steering and braking actions, acceleration and seatbelt use to name a few.

Different EDRs have different features. Some record data in a continuous loop of a set duration. Others are activated by a crash or crash-like event. Either way, the information they collect can establish key facts and valid evidence. Vehicle owners can work with their local dealership to retrieve data.



Dash-cams are increasingly common. Check vehicles involved in the crash. Perhaps another motorist at or near the crash scene captured footage of the events. Plus, with the increasing number and variety of traffic cams, surveillance cameras and other closed-circuit TV systems, there may be other sources to help you verify crucial facts. Ask around.

You may want to gather other documents that are relevant to the investigation - vehicle inspection and maintenance records, driver's licences and driving records, risk assessments, trip plans, recent work schedules, driver training records, tailgate and safety meeting notes, etc.

### Step 3: Map the Sequence of Events

Using the information you gathered - photos, measurements, statements, your own well-reasoned theory and relevant data - re-create the incident as a chronologically ordered series of events/ diagram that demonstrate what happened before, during and immediately after the crash.



Sometimes critical decisions are made and key events happen well before the crash. If it had a bearing on the crash, it belongs in the sequence of events.

There are two reasons for re-creating the events in a visual way.

1. It is an efficient visual summary of what happened; others can review the diagram to verify the description is accurate and the "flow" agrees with what they saw.

2. It provides a framework for asking important questions.

For each known event, ask whether another event should have happened before or after it. For example, a left turn should be preceded by the driver activating the left turn signal. If something should have happened but did not, make a note and find out why.



### Step 4: Determine Underlying Causes

Each of the facts - actions, decisions and conditions - established in the previous steps is an opportunity to ask, "why?" Testing and analyzing the theories the team develops is an iterative process during which you discover important new facts and possible explanations.

Referring to the sequence of events diagram, ask "why" repeatedly until you identify the unsafe conditions, acts or procedures that contributed to the incident. Write down the answers. As you ask and answer these questions, you will see other questions. Remember to explore details, even when they aren't obviously key facts.

Answers to the initial series of "whys" provide clues about immediate causes. Continuing to probe and ask "why" again will lead investigators to discover the root or underlying causes - the more fundamental circumstances that caused or contributed to the crash.

**Immediate causes** - unsafe or substandard acts, practices or conditions that lead directly to the incident. These include things like driving a vehicle with worn out tires or while knowingly impaired by stress or fatigue, lack of concentration, speeding, not knowing or failing to follow a safe work procedure, etc. Immediate causes are symptoms of the underlying causes of the incident.



**Root or Underlying causes** - explain why the immediate causes occurred; they are the organizational circumstances that allow unsafe conditions to exist, the conditions that facilitate unsafe decisions and the fundamental reasons behind unsafe actions. They include inadequate work planning, unrealistic work demands, incomplete systems, incorrect procedures and many others.

### Step 5: Recommend Corrective Actions

The core reason for examining crashes is to identify corrective actions the organization will take to ensure other crashes do not occur because of the same acts, conditions or decisions that caused this crash. Corrective actions should speak directly to the underlying causes identified in your analysis.

Sometimes when you examine the facts it will be apparent that your employee did everything right - the actions or omissions of a third party caused the crash. It's still worth looking for ways to prevent reoccurrence (e.g. training on crash avoidance techniques) but there is little value in looking for corrective actions that simply aren't there.



Use the framework below to determine what corrective actions to recommend.

### Organizational factors

For work-related crashes, much of the responsibility for changes aimed at preventing future crashes falls to the organization. The company sets the policies and procedures by which it requires employees to drive. The company is responsible to equip their employees with the training and supervision necessary to operate work vehicles, and to ensure work vehicles are fit for purpose. It is imperative that investigators look closely at organizational factors as they develop corrective actions.



Will inspections catch mechanical failures before they occur? Is the maintenance program all that it should be? Is there a gap in the personal vehicle fleet policy that allowed an employee to use their seriously deficient vehicle for work? How does the organization manage the trips employees take? Why was that employee delivering parcels when road conditions were treacherous? How do we strengthen our policies and how they are applied?

### Human factors

Think about the people involved, their actions and inactions. Determine what they can do differently to prevent recurrence, and how they can be equipped and motivated to do so. Focus on practices and behaviours that the company can control or influence. For example, if driver fatigue was a key factor the recommendations could spotlight:



1. What the employer and owners can do to make sure fatigue management is a safety priority
2. What managers can do to ensure employees understand fatigue and what they can do to avoid it
3. How supervisors and employees can collaborate to build schedules that avoid long driving assignments
4. How individual employees can self-manage and self-assess to know when they are fatigued, and be empowered to pull over and rest.

## Physical factors

If mechanical failures or conditions figured in the crash, consider the vehicles used for work. Are they designed and equipped so that they are fit for the purposes they are used? Do they have the right safety equipment? If environmental factors contributed to the crash, the organization can do very little to control the weather, but they can do quite a lot to manage if, when and how their employees drive during adverse weather conditions. Build recommendations around that understanding.



It's often tempting for investigators to make a "shopping list" of corrective actions - a long list of actions would be nice to do, but is rarely completed. Challenge your investigation team to arrive at the ONE THING that must be done to make sure this crash does not happen again. Keep the corrective actions list short, clear - and doable.

## Building the Report

There are several formats for building a report. Choose one that works well for people in your organization. Often, a well-structured investigation form can serve as the foundation for a well-organized report. Below is a framework you can use to build incident investigation reports.



## Summary

A brief summary of the incident including:

1. Who was involved; description of vehicle(s) involved
2. Depending on how the investigation report will be distributed, it is often appropriate to exclude names and other personal information of the people involved and witnesses. Instead, identify individuals as Driver A, Pedestrian B, Observer C, etc.
3. What happened - use the sequence of events; include suitable photos of the scene
4. When it happened - date, time; state day of the week or "day 11 of 12-day shift"
5. Where it happened - location, address and qualifiers (e.g., busy street, steep hill) if relevant
6. Names and roles of people investigating the crash

## Conclusions

Provide an overview of WHY the incident occurred, as determined by the investigation. Summarize the immediate and underlying causes.



## Recommendations

List the main recommendations aimed at preventing similar future events. Use a table that links each recommendation to the condition or finding that prompted it:

Underlying Cause	Recommended Corrective Action
<p>Improper planning and unrealistic scheduling:</p> <p>Crew was assigned three extra pick-ups with no accommodations for mandatory pick-ups.</p>	<p>RWC should develop and implement a procedure to build and verify achievable work schedules.</p>

These first three sections - the summary, conclusions and recommendations - are what most of the people who receive the report will actually read.

## Main Report

### 1. Purpose and Objectives

Explain why the organization conducted the investigation and what it expected to achieve. Beyond the core objectives of identifying root causes and finding ways to prevent recurrence, there may also be legal requirements, company policies and other reasons to consider.



### 2. Incident Description

Use factual statements to describe the events that happened before, during and immediately after the crash. Provide details about who, what, when and where. Include relevant peripheral events or factors.

### 3. Investigation Methods

Describe the investigation team - participant names, positions and qualifications. Explain site visits made. Insert photographs, sketches and diagrams that contribute to the explanation. Describe interviews conducted and summarize what was learned. If you conducted any simulations, tests or reconstructions, include the results here.



### 4. Findings

Organize the findings - what was discovered, confirmed or learned - so readers can easily follow the facts and logic used to develop the recommendations.

### 5. Recommendations

In addition to dealing with underlying causes in a comprehensive manner, explain the contributing factors and causes, and how they figured in the events and the incident. Link recommendations to findings.



### 6. Appendix

This information is important to the investigation but not essential to understanding the report and its recommendations. Include raw data and statistics, supporting diagrams, photos and interviews, a root cause analysis chart, copies of relevant documents, etc

## Step 6: Implement Corrective Actions

Now it's time to take action. The investigation team explained how the organization can make changes to prevent similar incidents. Put that knowledge to work as soon as possible.

Once they review the report with the management team, investigation team responsibilities are complete. Upper management must decide what actions the organization will implement, assign responsibilities, allocate resources and set completion dates. It can take considerable time to activate solutions to address deep-rooted underlying causes. However, investigations usually reveal matters that demand immediate attention by supervisors and managers.



As that occurs, the organization should also:

- track corrective actions to ensure they are carried out by the designated date
- evaluate how effective the recommended measures are
- periodically audit the system to verify measures remain in place, and effective.



## Corrective Action and Completion Table

Corrective Action	Assigned to	Expected Completion date	Completion date
<b>Immediate Action</b> - Review the incident with RWC teams; focus on the underlying causes and circumstances that contributed to the incident, and what changes RWC will make to prevent similar events	Raj - RWC safety coordinator; include Michelle and/or Carl	March 30, 2019	March 19, 2019
<b>Immediate Action</b> - Request that bin owner relocate the bin to the rear of the restaurant so RWC can easily access it from Fulton Avenue.	Tina - RWC operations manager	March 10, 2019	April 4, 2019
<b>Near Term</b> - Reinforce company appreciation / expectation that employees make safe decisions and follow procedures rather than take unnecessary risks.	Lorne - senior VP; at next quarterly safety mtg	April 15, 2019	April 15, 2019
<b>Near Term</b> - Develop and implement a process in which a) supervisors and dispatchers work with crews to build realistic routes and schedules, and b) supervisors review route and schedule changes with the driver before assigning that work.	Tina - RWC operations manager	May 15, 2019	May 14, 2019

Here is an example of a simple table that will help the organization track its progress.