Safety Transport Information

Prepared by WG-17 Transport Safety

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Vehicle Incident Investigation Management

Introduction

In the industrial and medical gas industry, road transportation is one of the highest risk activities. Not only can road vehicle accidents result in severe injuries to gas companies' employees, contractors' personnel or to third parties, but operations can also be severely impaired. In order to learn from road vehicle incidents that have occurred, they shall be thoroughly investigated, analysed, documented and reported. The objective of these activities is to identify actions that will reduce the risk of these incidents reoccurring.

Scope

This Transport Safety Information provides advice on vehicle incident investigation management. This publication does not provide guidance on how to handle vehicle and product recovery after an incident. For information on this topic, see EIGA Doc 81, *Road vehicle emergency and recovery* [1].

Definitions

Accident: An undesired event on the road giving rise to death, injury, damage or other loss (including environmental impact).

Incident: An event that gave rise to an accident or had the potential to lead to an accident.

Learning more about vehicle incident investigation management:

Do you and / or your contractors:

1. have procedures in place for management of road vehicle incident investigations?
2. have personnel identified to lead and/or participate in road vehicle incident investigations?
3. collect data relating to road vehicle incidents?
4. analyse the collected data?
5. have a communications process to use the data from road vehicle incident investigations to improve transport safety?

Do your and / or your contractor's:

6. personnel know how to report and record the details of a road vehicle incident?
7. managers know their responsibilities for investigating road vehicle incidents?

If the answer to any of the above questions is 'no', then you should consider taking action!

THIS TRANSPORT SAFETY INFORMATION GIVES GUIDANCE ON INVESTIGATING, ANALYSING, DOCUMENTING AND REPORTING ROAD VEHICLE INCIDENTS AND USING THE GAINED INFORMATION TO IMPROVE TRANSPORT SAFETY IN THE FUTURE.

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Vehicle incident investigation

The gas company shall decide on what kind of incidents shall be investigated, analysed, documented and reported, what management processes will be used, and who should lead and participate in the investigation on behalf of the gas company (the investigators). Investigators may be from inside and / or outside the gas company or their contractors, depending on what investigation skills are required.

The type and degree of any incident management process, including level of response, will depend on the actual or potential severity and outcome of the incident.

In order to effectively share information and identify trends in incidents, they should be classified in accordance with an agreed system, for example as in EIGA Doc 914, *Road Vehicle Accident Statistics* [2].

It is just as important to consider the loss potential associated with any incident, it is the potential severity and likelihood of the incident recurring that should determine the level of investigation, not simply the outcome such as injury, ill health or property damage suffered on each occasion.

Near misses, that is incidents not leading to injury or damages, but which under different circumstances could have become an accident, can give as much or more information on deficiencies as accidents do.

EIGA Doc 90, *Incident/Accident Investigation and Analysis*, gives general information on the investigation, analysis and reporting of incidents [3]. Its scope is to provide guidance in respect to the key elements of incident investigation and the analysis processes. The publication does not provide specific information concerning road vehicle incidents. Therefore, the following is a description of what to consider when managing the investigation of a road vehicle incident.

The following steps illustrate a possible procedure that may be followed by gas companies and their contractors after they have been notified of a road vehicle incident:

- Step 1: Collecting facts at scene of incident
- Step 2: Establish facts
- Step 3: Determine immediate and root causes
- Step 4: Evaluation of identified actions

} Investigation and analysis

- Step 5: Complete report

} Reporting and documentation

- Step 6: Implement preventive measures
- Step 7: Follow-up (lessons from incidents)

} Corrective actions for future operation

Step 1-4: Investigation and analysis

Step 1: Collecting facts at scene of incident

Investigations should commence immediately. The scene of the incident should be visited as soon as possible as important evidence can disappear quickly. Scene of incident evidence that determines the contribution of physical features, traffic and weather conditions are vital for a successful investigation, its subsequent reporting and determination of follow-up actions.

The scene of the incident will usually be attended by emergency services (fire services, police etc.). The gas company investigators should ensure that responsibilities and any access restrictions are fully understood and followed.

When undertaking initial scene of incident investigations, photographs of the complete scene should be taken. The following list can be used as guidance on aspects that could prove to be important to the investigation:

Item	*Description*
1	Width of roadways, rights of way, road signs for all directions, vision clearances, other obstructions and features.
2	Length, width and depth of ditches adjacent to the roadway.

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Item	*Description*
3	Point of impact with respect to: • centre line of road / line markings; and • curb line / edge of pavement.
4	Collision marks on tyres, roads and debris.
5	Distances and directions the vehicles travelled after impact.
6	Road markings.
7	Distance from point of impact to warning signs or traffic control devices.
8	Location of obstructions. Height of obstructions from roadway.
9	Distances from which involved drivers could have seen each other approaching the scene. NOTE Especially important for intersection incidents.
10	Distance from roadway to fixed object struck.
11	Distance from point of collision to detached parts of damaged vehicles.
12	Applicable speed limit.
13	Day, night, dusk or dawn light conditions and relevant position of the sun at time of incident.
14	Weather conditions at time of incident.
15	Traffic conditions at time of incident.
16	The presence or absence of roadway lighting.
17	Details of other vehicle(s) involved, including damage.
18	Use of seat belts.
19	Use of fire extinguishers.

The following table describes the type of evidence commonly found at the scene of an incident and the indications / conclusions that can be formed:

Evidence	*Indication / conclusion*
Tyre marks:	Skids / scuffs indicating: • braking; • vehicle speed; and / or • loss of traction.
Debris:	Establishes: • area (not exact point) of impact; • direction of travel; and / or • positioning (not always).
Gouges / damages on or near roadway:	Made by a vehicle under stress, points of contact and forces of impact.

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Step 2: Establish facts

Precise assessment:	With comprehensive and accurate data, investigators can make precise assessments of an incident's causes, classification, learnings and future avoidance.
Data collection:	It is extremely important that all facts and relevant information are collected. The investigators are responsible for collecting the following specific forms of data if available: • on-board vehicle data (on-board or remote electronic data storage devices, proving driving style and speeds, may be used towards reconstructing sequences of events); • photography, including capture of in-vehicle camera footage; • recovery of closed-circuit television (CCTV) from third party cameras in the vicinity; • witness statements; • documentation of findings from investigation, see Step 1; • analysis of route taken; • mobile phone records (network suppliers may be asked to check mobile phone use at relevant times, if legally possible); and • results of medical examinations or from medical records (can include a drug / alcohol abuse test or indication of medical conditions that could have contributed to the incident, for example sleep apnoea, eyesight).
Driver's statement:	The driver shall be interviewed as quickly as possible following an incident. A statement should be prepared with supporting diagrams and photographs, depending on the severity of the incident. Interviewing a driver quickly avoids distortion of a driver's recollections and subsequent amendments. Every effort should be made to verify the driver's account of an incident, for example by comparing the driver's statement with police reports / witness statements if available and investigators' findings at the scene of the incident.
Driver's interview:	During a formal interview, the investigators should determine the driver's attitude towards the incident in which they were involved. A response can indicate if the driver assumes that the incident was avoidable. Human factors should be explored in the interview to fully understand incident, for more information see EIGA Info HF 03, *Organisation – "Human Factors in Incident Investigation"* and EIGA Info TS 07, *Human Behaviour within Transport Operations* [4, 5].
Driver or third-party allegations concerning mechanical problems:	In the event of an incident where the driver or a third party alleges that a mechanical problem on the vehicle caused the incident (or was a contributing factor), then the vehicle shall be inspected by a qualified and independent vehicle technician. This shall be done before any components are replaced or disturbed. An independent report should also be completed. NOTE In the case of fatality or serious injury, an independent mechanical inspection of the vehicle should be considered.

In addition to the factual evidence gathered in steps 1 and 2, information on the specification and condition of the vehicle and load, background history of the vehicle should be collected.

Simulations may also be used to analyse an accident.

Step 3: Immediate and root causes

Following an incident, the immediate causes are normally relatively easy to identify. They are the circumstances which immediately precede the incident.

Root causes lie behind the immediate causes, and are the reasons why substandard conditions exist, or why inadequate implementation or compliance with management processes, systems, standards or regulations has occurred.

There are a number of methods used for immediate and root cause analysis each having varying degrees of complexity. More information can be found in EIGA Doc 90 [3].

Step 4: Evaluation of identified actions

Since there are such a variety of possible road vehicle incidents, it is not possible to give advice on which exact actions to take.

Actions should at least:

- address immediate and root causes;
- be reviewed to ensure that they minimise risk identified for example risk assessment;
- comply with standards and regulations; and
- be reviewed for relevance to gas company's standards and procedures (which shall be updated, if necessary).

For the implementation of actions see Step 6.

Step 5: Reporting and documentation

An investigation report should be written in a timely manner and communicate all important facts about the road vehicle incident. The objective of the report should be to be able to clearly identify findings, causes and corrective actions.

Once the internal report is completed, there may still be elements from police reports or from any external or legal findings that may need to be included at a later stage.

NOTE There may also be statutory reporting and notification requirements in accordance with the ADR, *European Agreement concerning the International Carriage of Dangerous Goods by Road* (Sections 1.8.3 Safety Advisor Report and 1.8.5 Notifications of occurrences involving dangerous goods) or with national regulations [6].

Step 5: Complete report

It is good practice to have a standard investigation report form for road vehicle incidents.

Using a standard form has several benefits, it:

- guides the report in a logical path and raises all the questions that should be answered such as:
    - what was the event?
    - what happened?
    - who was involved? and
    - what were the causes? etc.
- provides consistency in data reported;
- prompts sharing of information;
- allows analysis for trends which can support safety management; and
- can provide follow-up corrective actions.

NOTE The ADR Section 1.8.5.4, *Model for report on occurrences during the carriage of dangerous goods*, can be used for collecting data, but does not include detailed reporting of root causes and corrective actions [4].

For clear reporting it is beneficial that all departments of the gas company and its contractors use the same definitions for terms related to road vehicle incidents and categorisation of road vehicle incidents.

If possible, these terms should be those used by EIGA as defined in EIGA Doc 914 and EIGA Doc 90 [2, 3].

Steps 6 and 7: Corrective actions and preventive measures for future operation

When corrective actions have been identified, an action plan shall be prepared. The plan should include timing,

objectives and names of people (or departments) responsible for completion of the corrective actions. A management review process involving the gas company and contractor shall be in place to ensure all actions identified are closed in a timely manner.

Step 6: Implement preventive measures

The investigation and analysis of a road vehicle incident should enable the gas company and / or contractor to determine both the immediate and root causes of the incident and highlight or indicate which parts of transport management and operations may require improvement.

If the driver contributed to the incident, it is possible that there are potential preventive measures in management processes that can reduce the risk of drivers contributing to such incidents in the future.

It is recommended that the following specific areas are addressed when implementing agreed actions for preventing similar incidents:

- all safety aspects that failed or were implicated;
- failure of management systems and procedures;
- failure of recruitment or training processes, for further information see EIGA Info TS 03, *Training: Induction and Refresher Training of Drivers, Management & Other Transport Function Personnel* [7];
- driver behaviours (human factors), for further information see EIGA Info HF 03 and EIGA Info TS 07 [4,5]; and
- failure of equipment or vehicles.

If it appears that a driver has been traumatised or affected by an incident, the gas company and / or contractor should recommend that they seek medical advice, where professional support or counselling may be offered.

Should disciplinary actions be implemented, they should be fair, consistently applied and corrective, aiming to improve standards.

Step 7: Follow-up (lessons from incidents)

The implementation of preventive measures and corrective actions should be recorded and regularly reviewed.

Management processes should be in place to ensure information concerning incidents and learnings are shared and any preventive actions may be implemented beyond the location, country and function where the incident occurred (for example health and safety, logistics, fleet maintenance, vehicle procurement, human resources).

Communication actions may include:

- immediate actions such as:
    - safety alerts;
    - toolbox meetings; and
    - safety talks.
- short term actions such as:
    - newsletters; and
    - group meetings etc.
- long term actions such as:
    - changes in company standards or procedures; and
    - retraining programmes.

The most severe incidents or those with possible influence on regulations should be communicated within the gas industry, through EIGA, to improve safety throughout the entire industry.

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References

Unless otherwise specified, the latest edition shall apply.

[1] EIGA Doc 81, *Road vehicle emergency and recovery*, www.eiga.eu.

[2] EIGA Doc 914, *Road Vehicle Accident Statistics*, www.eiga.eu.

[3] EIGA Doc 90, *Incident/Accident Investigation and Analysis*, www.eiga.eu.

[4] EIGA Info HF 03, *Organisation – "Human Factors in Incident Investigation"*, www.eiga.eu.

[5] EIGA Info TS 07, *Human Behaviour within Transport Operations*, www.eiga.eu.

[6] ADR, *European Agreement concerning the International Carriage of Dangerous Goods by Road*, www.unece.org.

[7] EIGA Info TS 03, *Training: Induction and Refresher Training of Drivers, Management & Other Transport Function Personnel*, www.eiga.eu.

Further information

EIGA Info TS 01, *Transport Safety Information, an Overview*, www.eiga.eu.

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