BEYOND FAULT AND PREVENTABILITY

Reframing Motor Vehicle Crash Risk Through Critical Controls, IOGP Classification, and Continuous Performance Monitoring

DEAN ARAVIDIS AND DANIEL GARSTANG, BG ROAD SAFETY

Executive Summary

Motor vehicle crashes continue to represent one of the most significant and persistent sources of fatal and serious injury across industrial operations worldwide. Despite decades of investment in safety systems, training programs, regulatory compliance, and technological advancement, organisations operating vehicle fleets — whether directly or through contractors — continue to experience high-consequence events. This persistent exposure indicates not a failure of intent, but a failure in how risk is conceptualised, measured, and managed (WHO, 2023; NHTSA, 2022).

At the core of this issue lies the continued reliance on traditional crash classification models, particularly the categorisation of incidents as "preventable" or "non-preventable," and "at fault" or "not at fault." While these classifications serve legitimate legal and administrative purposes, their application as indicators of safety performance introduces a fundamental distortion. By filtering incidents through a lens of blame and perceived controllability, organisations inadvertently exclude significant portions of exposure from analysis. This results in an incomplete and often misleading representation of risk, particularly in relation to fatal and serious injury potential (IOGP, 2020; Energy Institute, 2021).

This paper critically examines the limitations of these traditional classification models and demonstrates how they contribute to systemic underestimation of risk. It argues that the question of fault is largely irrelevant in the context of safety management, where the primary objective is not to assign responsibility, but to understand and control exposure (Reason, 1997; Dekker, 2014).

In response, the paper introduces a control-based framework for analysing motor vehicle crashes, supported by the adoption of the International Association of Oil & Gas Producers (IOGP) motor vehicle crash classification system.

Unlike traditional approaches, the IOGP framework classifies incidents based on outcome and potential severity, ensuring that all relevant events — particularly those with high fatal potential — are captured and analysed (IOGP, 2020).

The paper further integrates this framework into a continuous performance monitoring model enabled through platforms such as Avetta. It demonstrates that prequalification, audits, and assessments, while necessary, are insufficient to manage dynamic operational risk. Instead, organisations must adopt a model of ongoing data collection, analysis, and

intervention, where real-world performance — not documented compliance — becomes the basis for decision-making (Campbell Institute, 2013).

1. Introduction

The management of road transport risk within industrial operations has long been characterised by a tension between complexity and simplification. Driving is inherently complex, involving dynamic interactions between human behaviour, vehicle systems, environmental conditions, and organisational influences (Shinar, 2017). In response, organisations have historically simplified this complexity through structured systems, procedures, and metrics designed to make risk measurable and manageable.

Among the most enduring of these simplifications is the classification of motor vehicle crashes according to fault and preventability. These classifications have become deeply embedded within organisational safety frameworks, shaping how incidents are reported, analysed, and interpreted.

In many cases, they form the basis of key performance indicators, influencing leadership perception, resource allocation, and strategic decision-making.

However, this reliance on simplified classifications has introduced a critical flaw. By reducing complex events to binary outcomes, organisations obscure the underlying mechanisms of risk.

More importantly, they create a structural bias that filters out events deemed to be outside the control of the driver or organisation. This filtering effect is particularly problematic in the context of high-consequence events, where the presence of external factors does not diminish the severity of the outcome (Haddon, 1980).

A fatal crash involving another road user may be classified as "not at fault," yet the consequence remains unchanged. The organisational exposure is real, and the potential for similar events persists. By excluding such incidents from meaningful analysis, organisations fail to recognise patterns of exposure and miss opportunities for intervention.

2. The Structural Limitations of Fault and Preventability

The classification of crashes as "preventable" or "non-preventable" is often presented as a rational method for distinguishing between events that could have been avoided and those that could not. In practice, however, this distinction is far from objective and is heavily influenced by hindsight bias and subjective interpretation (Reason, 2000).

The concept of preventability assumes that it is possible to determine, with reasonable certainty, whether a driver could have taken action to avoid an incident. This assumption is problematic because it relies on retrospective analysis, where the outcome is already known. Research in human factors demonstrates that hindsight bias significantly influences how events are interpreted after the fact, often overstating the degree of control available to individuals at the time (Dekker, 2011).

Furthermore, the determination of preventability often focuses narrowly on driver behaviour, without adequately considering the broader system in which the driver operates. Factors such as fatigue, workload, route design, vehicle condition, and organisational pressures play a critical role in shaping outcomes (FMCSA, 2021; ATSB, 2019).

The classification of fault introduces an additional limitation. Fault is a legal construct designed to assign liability, not to explain causation or system failure. As such, it has limited value in safety management, where the objective is to understand how and why controls failed (Reason, 1997).

When these classifications are embedded into performance metrics, they distort the dataset by excluding events deemed non-preventable. This leads to underreporting of exposure and creates a false perception of improved safety performance.

3. Reframing Risk Through Outcome and Potential

A more effective approach to motor vehicle crash classification is one that focuses on outcome and potential rather than blame. This approach is reflected in the IOGP motor vehicle crash classification framework, which categorises incidents based on severity and consequence (IOGP, 2020).

This framework distinguishes between fatal events, lost workday cases, recordable injuries, and high-potential near misses. The inclusion of high-potential events is particularly important, as it aligns with contemporary approaches to Serious Injury and Fatality (SIF) prevention (Energy Institute, 2021).

The concept of potential recognises that the absence of injury does not equate to the absence of risk. A high-energy near miss may represent the same level of exposure as a fatal event, differing only by chance. This aligns with the principles of injury epidemiology, where risk is understood in terms of energy transfer and system conditions rather than outcome alone (Haddon, 1980).

By adopting this framework, organisations ensure that all relevant events are captured and analysed, providing a more complete and accurate representation of risk.

4. Case Analysis: Intersection Collision Revisited

Consider a collision at a rural intersection where a driver with right of way is struck by another vehicle that fails to stop. Under traditional classification, this event would likely be recorded as non-preventable and not at fault.

Using an outcome-based framework, the classification reflects the severity of the event, ensuring that it is included in performance metrics. This enables a deeper analysis of contributing factors, including intersection design, visibility, driver behaviour, and route selection.

Research in driver behaviour indicates that experienced drivers are capable of anticipating hazards based on environmental cues, even in situations where they have right of way (Shinar, 2017). This suggests that opportunities for risk mitigation may exist even in events traditionally classified as non-preventable.

5. The Role of Critical Controls

The concept of critical controls is central to modern safety management. These controls are designed to prevent high-consequence events or mitigate their severity. Their effectiveness depends on both design and implementation.

Contemporary safety science emphasises that accidents occur not as a result of a single failure, but through the alignment of multiple system weaknesses (Reason, 1997). This perspective is reinforced by resilience engineering, which focuses on how systems adapt and respond under varying conditions (Hollnagel, 2014).

In the context of road transport, critical controls span driver capability, vehicle integrity, journey planning, and organisational governance. The failure of any one control increases risk; the failure of multiple controls results in incidents.

6. Continuous Monitoring as a Foundation for Assurance

Traditional assurance processes provide only a static view of performance. In contrast, continuous monitoring enables organisations to understand how risk evolves over time.

The use of telematics and operational data provides insight into driver behaviour, exposure, and system performance. Studies using naturalistic driving data have demonstrated strong correlations between behavioural indicators such as speeding and harsh braking and crash risk (AAA Foundation, 2016).

By integrating this data into a structured framework, organisations can identify trends, detect emerging risks, and intervene proactively. This aligns with leading indicator approaches to safety management, which focus on predicting and preventing incidents rather than reacting to them (Campbell Institute, 2013).

7. Measuring What Matters

Effective performance measurement requires alignment with exposure and risk. Traditional metrics based on preventability fail to capture this relationship.

A more effective approach includes exposure-based metrics, behavioural indicators, and outcome-based classification. This enables organisations to understand not only what has happened, but why it has happened and where future risk lies.

The integration of these metrics supports a shift from reactive to proactive safety management.

8. Conclusion

The classification of motor vehicle crashes as preventable or non-preventable, and at fault or not at fault, is no longer sufficient for managing modern road transport risk.

These models distort data, exclude critical exposure, and create a false sense of security. A shift toward outcome-based classification, critical control verification, and continuous monitoring is essential.

The IOGP framework provides a robust foundation for this shift, ensuring that all events are captured and analysed. When combined with continuous monitoring and data-driven decision-making, it enables organisations to develop a more accurate and actionable understanding of risk.

Ultimately, preventing fatal and serious injury requires a system that reflects reality, measures what matters, and continuously adapts to changing conditions.

References

AAA Foundation for Traffic Safety (2016) Using Naturalistic Driving Data to Assess Driver Risk. Washington, DC: AAA Foundation.

Australian Transport Safety Bureau (ATSB) (2019) Fatigue in Transport Operations: Research and Analysis. Canberra: ATSB.

Campbell Institute (2013) Transforming EHS Performance Measurement Through Leading Indicators. National Safety Council, Itasca.

Dekker, S. (2011) Drift into Failure: From Hunting Broken Components to Understanding Complex Systems. Farnham: Ashgate.

Dekker, S. (2014) The Field Guide to Understanding Human Error. 3rd edn. Boca Raton: CRC Press.

Energy Institute (2021) Guidance on Serious Injury and Fatality (SIF) Potential. London: Energy Institute.

Federal Motor Carrier Safety Administration (FMCSA) (2021) Large Truck Crash Causation Study. Washington, DC: U.S. Department of Transportation.

Haddon, W. (1980) 'Advances in the epidemiology of injuries as a basis for public policy', Public Health Reports, 95(5), pp. 411–421.

Hollnagel, E. (2014) Safety-I and Safety-II: The Past and Future of Safety Management. Farnham: Ashgate.

International Association of Oil & Gas Producers (IOGP) (2020) Land Transportation Safety Recommended Practice. Report No. 365. London: IOGP.

National Highway Traffic Safety Administration (NHTSA) (2022) Traffic Safety Facts Annual Report. Washington, DC: U.S. Department of Transportation.

Reason, J. (1997) Managing the Risks of Organizational Accidents. Aldershot: Ashgate.

Reason, J. (2000) 'Human error: models and management', BMJ, 320(7237), pp. 768–770.

Shinar, D. (2017) Traffic Safety and Human Behavior. 2nd edn. Bingley: Emerald Publishing.

World Health Organization (WHO) (2023) Global Status Report on Road Safety 2023. Geneva: WHO.

ROAD SAFETY