

The Alarm Was On. The Pipe Had Just Been Inspected. It Failed Anyway.

Catch What Sensors Miss: AI Targets Human Oversight in Industrial Safety Protocols



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SECTION 1: EXECUTIVE SUMMARY

In the realm of industrial safety, the narrative has long been dominated by the quest to predict and prevent equipment failure. However, EON AI Ventures has shifted the focus toward a less visible yet equally critical aspect: human error. Through an in-depth analysis of 21,386 official accident reports spanning four decades, the company has identified a recurring theme—safety equipment is typically functioning as intended when incidents occur. The real culprit often lies in human oversight, notably the **post-completion error**, where crucial steps are overlooked after a task appears to be completed.

The implications of these findings are significant. While the industry has developed sophisticated systems to forecast mechanical failures, such as bearings wearing out or pipes thinning, these account for only part of the picture. EON AI Ventures' research reveals that a substantial portion of serious industrial accidents stem from human errors, particularly when safety protocols are inadvertently bypassed or forgotten. This oversight is not due to negligence but rather a cognitive bias where the brain prematurely concludes a task as complete.

EON AI Ventures is at the forefront of addressing this gap with the introduction of **EON Delta**, a suite of specialized AI models encapsulated in the **V8 package**. These models are uniquely trained on the documented history of real industrial accidents, distinguishing them from generic AI solutions that rely on broad datasets. By focusing on human factors, EON Delta targets the nuances of human-machine interaction, predicting and mitigating risks associated with human error.

Key to EON Delta's approach is the recognition of different types of industrial risks, which are often conflated in traditional safety paradigms. There are three distinct problems: physical wear, human oversight, and decaying safety measures. While the industry has robust solutions for the first, EON Delta uniquely addresses the latter two, which are often overlooked.

The data paints a stark picture. For instance, only 24.3% of pipeline problems are detected by control rooms, despite constant monitoring. Similarly, 63.4% of failures occur within two years of an inspection, highlighting that the inspections, while thorough, are not foolproof. Moreover, 63.3% of incidents involving diggers occur despite adherence to protocol. These statistics underscore a critical insight: the systems in place are adept at identifying mechanical issues but falter when it comes to human errors.

EON AI Ventures offers a solution that transcends traditional boundaries. By leveraging AI to predict where human errors are likely to occur, EON Delta provides actionable insights before any data from a specific site is even analyzed. This proactive stance is pivotal in transforming workplace safety, shifting from reactive measures to preventative strategies.

The practical application of these insights is profound. By analyzing work procedures and identifying steps prone to being forgotten, EON Delta enables companies to preemptively address potential oversights. This capability is not just theoretical; it is immediately applicable. Companies can submit their procedures to EON, and within days, receive a detailed analysis highlighting potential pitfalls and recommended changes.

For the workforce, this translates into tangible benefits. Technicians receive visual cues on the steps most likely to be missed, maintenance supervisors gain foresight into procedure vulnerabilities, plant managers experience fewer unplanned shutdowns, and safety directors acquire defensible methodologies to enhance safety protocols.

In conclusion, EON AI Ventures is not merely adding another layer to existing safety measures but is fundamentally redefining the landscape of industrial safety. By focusing on the human element, the company's AI solutions bridge the gap between what current systems can detect and the reality of human oversight. This innovative approach promises a future where industrial safety is not just about preventing mechanical failures but about understanding and mitigating the complexities of human behavior in high-stakes environments.

SECTION 2: THE PROBLEM/CHALLENGE

In the complex arena of industrial operations, the pursuit of safety has traditionally centered around machinery and equipment reliability. However, an often-overlooked dimension—human error—remains a significant contributor to industrial accidents. Despite the presence of functioning safety equipment, incidents occur due to human errors, particularly **post-completion errors**, which traditional systems fail to anticipate or prevent.

EON AI Ventures has delved into this issue by examining 21,386 accident reports, uncovering that safety equipment was operational in the majority of cases when things went awry. This revelation challenges the prevailing wisdom that mechanical failures are the primary concern. Instead, it highlights the critical role of human factors in industrial safety.

The **post-completion error** is a well-documented cognitive phenomenon where individuals mistakenly perceive a task as complete once the primary objective is achieved, neglecting subsequent essential steps. For example, a technician may successfully restart a pump but forget to reinstall a safety guard. This oversight is not a matter of negligence but rather a cognitive lapse, rooted in how the human brain processes task completion.

Current safety systems excel at monitoring mechanical integrity, such as detecting wear and tear or predicting equipment failure. However, they fall short when it comes to predicting human errors. The statistics are telling: control rooms, designed to monitor pipeline safety, detected issues only 24.3% of the time, with humans often identifying problems first. Similarly, 63.4% of pipeline failures occurred within two years of inspection, and in 63.3% of cases where a line was struck by a digger, protocols had been followed. These figures underscore a pervasive issue—mechanical systems cannot compensate for human oversight.

The challenge lies in integrating disparate systems and information streams to provide a cohesive safety strategy. Often, critical data points reside in silos, with no mechanism to synthesize them into actionable insights. For instance, an alarm system might indicate a fault, but if this information is not cross-referenced with maintenance schedules or operational protocols, potential risks remain unaddressed.

EON AI Ventures identifies this disconnect as a fundamental issue and has developed **EON Delta** to tackle it. This set of AI models, part of the **V8 package**, is specifically designed to address the nuances of human error in industrial settings. Unlike generic AI models, EON Delta is trained on real-world accident data, providing insights that are both practical and predictive.

The model categorizes industrial risks into three distinct areas: physical wear, human oversight, and decaying safety measures. While the first is well-served by existing solutions, EON Delta uniquely addresses the latter two, filling a critical gap in the current safety paradigm. The ability to predict human errors without relying on site-specific data represents a significant advancement in industrial safety.

By analyzing work procedures, EON Delta identifies steps that are commonly missed, allowing companies to proactively mitigate risks. This capability is particularly beneficial in high-stakes environments where human oversight can have catastrophic consequences. Technicians can be forewarned of the most frequently missed steps, while supervisors can receive procedure analyses highlighting potential vulnerabilities.

In essence, the challenge is not just about enhancing mechanical reliability but about understanding and mitigating human limitations. EON AI Ventures offers a transformative solution that not only predicts where human errors are likely to occur but also provides actionable insights to prevent them. This approach aligns with the company's mission to act as the bridge between human expertise and workforce capability, ensuring a safer, more efficient industrial environment.

SECTION 3: THE SOLUTION

EON Delta, a groundbreaking suite of AI models, is revolutionizing the prediction and prevention of human error in industrial environments by leveraging insights from real accident records. Unlike traditional approaches that focus predominantly on equipment failure, EON Delta addresses human error—a critical factor often overlooked in industrial safety.

At the heart of industrial safety challenges is the **post-completion error**, a well-documented phenomenon where individuals overlook crucial final steps once the primary task appears complete. EON Delta is designed to mitigate these oversights by focusing on the human element of industrial operations. By analyzing 21,386 accident reports spanning four decades, EON AI Ventures has identified that safety equipment is frequently operational during incidents, emphasizing the need for a solution that anticipates human error.

EON Delta is not just an AI solution; it is a proactive partner in industrial safety. It operates on the principle that while machines and sensors can predict mechanical failures, predicting human oversight requires understanding the work environment and procedures. The AI models within EON Delta are trained specifically on documented industrial accidents, allowing them to focus on real-world problems rather than hypothetical scenarios. This specialized training enables EON Delta to predict potential procedural missteps, thereby reducing the likelihood of accidents triggered by human error.

One of the standout features of **EON Delta** is its ability to function without relying on extensive historical data from a specific client. Instead, it utilizes its vast database of accident records and procedure documents to identify common error-prone steps in various industrial processes. This capability allows EON Delta to offer immediate insights into potential risks, making it a practical tool for improving safety protocols from day one.

When a company provides EON Delta with their operational procedures, the AI quickly analyzes these documents to pinpoint steps that are historically prone to being overlooked. This analysis results in a marked-up version of the procedure, highlighting potential problem areas and suggesting modifications to enhance safety and reliability. This proactive approach can significantly reduce the occurrence of human error, leading to fewer unplanned shutdowns and improved overall safety.

In conclusion, **EON Delta** represents a paradigm shift in industrial safety. By addressing the human factors in procedural operations, it fills a critical gap left by traditional safety measures that predominantly focus on equipment and sensor data. EON Delta not only predicts where human error is likely to occur but also provides actionable insights to prevent

it, thus transforming workforce capability for the AI era and bridging the gap between expert knowledge and workforce execution.

SECTION 4: KEY FEATURES/CAPABILITIES

EON Delta is meticulously designed to tackle three major areas of industrial risk: metal wear, human error in procedural steps, and neglected safety measures. Each of these areas is crucial in ensuring comprehensive industrial safety, and EON Delta's capabilities are tailored to address them effectively.

Metal Wear

The first area, **metal wear**, involves the gradual degradation of equipment components over time. Although this is a well-covered domain with numerous existing solutions, EON Delta integrates insights from these traditional approaches to provide a holistic view. By leveraging the outputs from established detection systems, EON Delta avoids redundancy and instead focuses its innovation on predicting and preventing the human errors that often accompany mechanical failures.

Human Error in Procedural Steps

Perhaps the most groundbreaking feature of **EON Delta** is its approach to predicting **human error in procedural steps**. It recognizes that many industrial incidents are not purely mechanical but are initiated by human mistakes, such as the **post-completion error**. EON Delta's AI models analyze written work procedures to identify steps that are likely to be overlooked. These steps often include actions that occur after the main task, such as refitting guards or closing drains, which can be forgotten once the primary task seems complete.

EON Delta's ability to predict these overlooked steps is based on identifying patterns in historical data where human error has frequently occurred. For instance, it can pinpoint steps that lack immediate feedback, such as a click or light, which are often missed. By highlighting these potential pitfalls before any work begins, EON Delta empowers

technicians, supervisors, and managers to proactively address them, thereby reducing the risk of accidents.

Neglected Safety Measures

The third focus area of **EON Delta** is on **neglected safety measures**, such as alarms that are turned off during shutdowns and never reactivated. EON Delta identifies these vulnerabilities by cross-referencing incident records with current safety protocols, ensuring that such oversights are recognized and rectified before they contribute to an incident.

Practical Applications

For technicians, EON Delta offers visual cues on the actual equipment, highlighting the most commonly forgotten steps in a given procedure. This real-time guidance ensures that even the most routine tasks are completed safely and thoroughly. Maintenance supervisors benefit from receiving procedures marked with potential weak points before crews are dispatched, enabling them to preemptively address areas of concern. Plant managers and safety directors gain from reduced unplanned shutdowns and a defensible method for ensuring compliance and safety.

In summary, **EON Delta** is a comprehensive solution tailored to meet the unique challenges of industrial safety. Its focus on human error and neglected safety measures complements traditional equipment monitoring, offering a nuanced approach that addresses the complex interplay of machinery and human factors. By doing so, EON Delta not only predicts where incidents might occur but also provides the tools and insights necessary to prevent them, embodying a transformative approach to industrial safety in the AI era.

SECTION 5: HOW IT WORKS

EON Delta is a groundbreaking innovation in industrial safety, designed to address the often overlooked human element in industrial operations. It leverages advanced **AI models** to evaluate and enhance written work procedures, aiming to prevent post-completion errors and

ensure that critical steps are not missed. This approach involves a multi-layered evaluation process that incorporates job context, provides timely warnings, and automatically records outcomes to refine predictions.

EON Delta begins by analyzing the content of written work procedures provided by clients. The AI models are trained to identify which steps in a procedure are most prone to being forgotten. These are typically steps that occur after the perceived completion of a task, such as refitting a guard, closing a drain, or removing a blank. The system also identifies steps that lack a sensory confirmation, like a click or a light, steps that undo previous actions, and steps that follow interruptions or differ from similar procedures on adjacent equipment.

By examining these procedures, EON Delta provides a predictive analysis of where potential errors might occur. This analysis results in a marked-up version of the procedure, highlighting the risky steps and suggesting changes to mitigate these risks. This predictive capability is made possible without the need for sensors or historical accident data, relying solely on the procedure documents.

Incorporating job context is another crucial aspect of EON Delta. The system considers the specific environment in which the technician operates, recognizing that human factors such as fatigue, distraction, or routine can significantly impact performance. By understanding these contextual elements, EON Delta can tailor its predictions and warnings to the unique conditions of each job.

Once potential risks are identified, EON Delta provides timely warnings to the technicians. Before starting a task, technicians receive visual cues on the actual equipment, highlighting the steps most likely to be missed and the checks that most reduce immediate risk. This proactive approach helps technicians focus on critical actions, thereby reducing the likelihood of errors.

Moreover, EON Delta automatically records the outcomes of each task performed. This data collection is crucial for refining the system's predictive capabilities. By analyzing the results of past operations, EON Delta can continuously improve its understanding of procedural risks

and enhance its predictive accuracy over time. This feedback loop ensures that the system remains effective and relevant, adapting to new challenges and operational changes.

In summary, EON Delta works by evaluating written procedures for risky steps, considering job context, providing timely warnings, and recording outcomes to refine predictions. This comprehensive approach not only helps prevent human errors but also enhances the overall safety and efficiency of industrial operations.

SECTION 6: BENEFITS/OUTCOMES

EON Delta offers a transformative impact on industrial safety by providing immediate insights into work procedures, reducing unplanned shutdowns, offering defensible safety methods, and capturing critical operational knowledge.

One of the primary benefits of EON Delta is its ability to offer immediate insights into work procedures. By analyzing these procedures and identifying steps prone to post-completion errors, EON Delta provides companies with a marked-up version of their procedures. This proactive insight allows maintenance supervisors to address potential issues before they arise, rather than merely reacting to errors after they occur. As a result, technicians are better prepared, and the likelihood of human error is significantly reduced.

The reduction of unplanned shutdowns is another major outcome of implementing EON Delta. The analysis of 21,386 accident reports revealed that many industrial failures do not stem from equipment malfunction but from human error. By identifying and mitigating these errors, EON Delta helps ensure that routine operations do not lead to unexpected equipment downtime. This reliability is particularly valuable for plant managers, who benefit from smoother operations and fewer disruptions.

EON Delta also provides a method for safety management that is both rigorous and defensible. Unlike traditional safety measures that rely solely on equipment monitoring, EON Delta incorporates human factors into its risk assessments. This comprehensive approach ensures that safety directors have a robust method to defend their safety protocols. By

addressing both the technical and human aspects of safety, EON Delta enhances the credibility and effectiveness of safety strategies.

Furthermore, EON Delta captures critical operational knowledge, which is essential in an era where a significant portion of the workforce is nearing retirement. By documenting and analyzing the outcomes of work procedures, EON Delta helps preserve the knowledge and expertise of experienced technicians. This knowledge retention is crucial for maintaining operational continuity and training the next generation of workers.

Overall, EON Delta enhances industrial safety by providing immediate insights, reducing unplanned shutdowns, offering defensible safety methods, and capturing operational knowledge. Its unique approach to addressing human error in industrial settings makes it an invaluable tool for companies looking to improve safety and efficiency in their operations.

Conclusion

EON AI Ventures is poised to revolutionize the landscape of **industrial safety** by addressing a critical, yet often overlooked, aspect of risk management: human error. The company's innovative approach is rooted in a profound understanding of the **post-completion error**, a well-documented phenomenon where crucial steps are forgotten as tasks near completion. This oversight, not equipment failure, frequently leads to significant industrial accidents. By harnessing this insight, EON AI Ventures is uniquely positioned to bridge the gap between existing safety protocols and the unpredictable nature of human oversight.

The cornerstone of EON AI Ventures' strategy is the **EON Delta**, a sophisticated suite of **AI models** that transcends traditional methods of industrial risk detection. Unlike conventional systems that solely focus on mechanical wear and tear, EON Delta addresses the multifaceted nature of industrial safety by integrating the human element into its predictive algorithms. This is critical because, according to EON's analysis of 21,386 accident reports, safety equipment was functioning correctly in most incidents, yet human error remained a persistent cause of failure.

EON Delta's V8 package distinguishes itself by tackling industrial risk as three separate, yet interconnected problems: metal wear, human error, and decaying safety defenses. While the market is saturated with solutions for the first problem, the latter two have been largely neglected. EON Delta's focus on these areas is revolutionary, providing the much-needed oversight for steps often missed by humans or ignored by current systems.

Human error, particularly the **post-completion error**, is notoriously difficult to predict because it requires understanding both the job and the equipment intimately. EON AI Ventures' approach involves analyzing work procedures to identify which steps are most susceptible to being overlooked. This foresight is grounded in real industrial accident data, making the predictions not only innovative but also deeply reliable. The **AI models** employed do not rely on extensive customer data, accident history, or sensors. Instead, they utilize procedure documents already used in training simulations, allowing for rapid deployment and immediate value generation.

This approach is particularly beneficial for various stakeholders within an industrial setting:

- **Technicians** receive insights on steps most frequently missed and checks that significantly reduce risk, presented visually on the equipment they will work with, enhancing their preparedness and vigilance.
- **Maintenance supervisors** benefit from procedurally marked-up documents highlighting potential weak points before their teams even begin their tasks, shifting the focus from retrospective analysis to proactive risk management.
- **Plant managers** experience fewer unplanned shutdowns, as the analysis targets routine equipment failures that existing warning systems overlooked, thereby reducing operational disruptions.
- **Safety directors** are equipped with a defensible method that integrates seamlessly with existing safety protocols, strengthening their safety assurances and compliance postures.

EON AI Ventures' commitment to transforming industrial safety is further underscored by its ability to synthesize disparate data points across multiple systems. The company recognizes that real-time integration and analysis of data from various sources are crucial for preventing accidents. This holistic approach ensures that industries are not merely reacting to incidents but actively preventing them by understanding when and why they might occur.

In conclusion, EON AI Ventures, through the **EON Delta V8 package**, offers a visionary solution that aligns with the complexities of modern industrial operations. By focusing on human error and decaying safety defenses, EON AI Ventures provides a comprehensive safety net that conventional methods fail to offer. This not only enhances safety outcomes but also redefines the standards for industrial risk management. As industries continue to evolve, the need for such innovative solutions becomes increasingly critical, and EON AI Ventures is at the forefront, ensuring that human oversight does not compromise industrial safety.

About EON AI Ventures

EON AI Ventures is the acceleration layer between AI capability and workforce readiness. We transform how enterprises capture, transfer, and apply expert knowledge through AI-powered immersive learning solutions.

Our platform addresses the critical challenge of knowledge transfer as 50% of expert workers approach retirement in the next 5-7 years, ensuring organizations maintain operational excellence in high-stakes environments.

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