Safetytech Accelerator

DISCOVERING SAFETY

Smarter Regulation Sandbox (SRS)

Summary of use cases

Overview of Sandbox

Discovering Safety (a programme of work led by Great Britain's Health and Safety Executive, HSE) collaborated with Safetytech Accelerator to deliver the Smarter Regulation Sandbox (SRS). The Sandbox fostered collaboration between regulators, industry stakeholders, and technology companies to improve workplace safety by harnessing the full potential of the digitalisation of regulations to reduce the burden of regulation and therefore accelerate compliance.

While regulation is currently available online, not all are 'machine readable', while regulatory data is only available ad-hoc. SRS explored 5 use cases for how full digitalisation of these digital assets can be used by the industry to make health and safety regulatory information more accessible to organisations. Thereby, accelerating compliance, improving efficiency and productivity and reducing regulatory burdens on industry, whilst supporting innovators to bring emerging digital products to market.

The project aimed to reveal how emerging technologies can impact the way organisations engage with regulation and guidance by providing:

- Industry with increased assurance, confidence, and clarity on compliance
- Regulators with a pro-innovation environment to trial smarter interventions
- Tech companies with the opportunity to capture and use smarter regulatory information

Each use case was a collaborative investigation between a technology provider, industrial partner and sector experts from HSE.

The SRS builds on the success of the world's first, award-winning, Industrial Safetytech Regulatory Sandbox which concluded in September 2023 and proved an effective way to share expert knowledge from research in a collaborative and innovative environment using a Sandbox approach.

This project has been made possible through funding won from the Knowledge Asset Grant Fund (KAGF), run by the Government Office for Technology Transfer (GOTT) and funded by the Department for Science, Innovation and Technology (DSIT).

Exploring the use of AI models in mapping safety standards, identifying compliance gaps, and enhancing safety using real-world HSEQ data

Comet

COMET is a provider of software and services to improve business performance and eliminate repeat failures. Our intelligent data-driven software and expertise help to mitigate past, present and future risks.

Investigation focus

The project explored how existing machine learning models for severity, underlying and root cause, together with other AI tools, could classify HSE data (incident reports, near misses, audits) for adherence to safety standards (e.g., RM3). It also investigated whether insights from AI-driven analysis could inform the evolution of these standards.

Activities and collaboration

- **HSE Data Review:** Assessed AI-classified data for quality and applicability.
- **Stakeholder Engagement:** Consulted Eurotunnel, Gatwick Airport, and Colas Rail on their HSEQ data and compliance processes.
- **Standards Mapping (RM3):** Evaluated RM3's structure, maturity scoring, and applicability beyond rail.
- **Workshops and Proof-of-Concepts:** Developed engineering tests to assess AI's ability to determine standards adherence.

Learning and recommendations

Data quality and information needs alignment are critical, as many organisations struggle with inconsistent and incomplete safety data, limiting AI effectiveness. Structured audit and assurance data proved more reliable for compliance assessment than incident reports. AI models require further maturity, needing better training to distinguish compliance levels accurately. Subject Matter Experts (SMEs) are essential for interpreting AI-generated insights. Regulatory engagement with HSE and other bodies remains crucial to refining AI applications in safety compliance.

Impact

The Sandbox enabled COMET to refine its AI-driven safety compliance solutions through industry collaboration and regulatory alignment. It provided a foundation for scaling AI in regulatory compliance and wider adoption in machine-readable regulations.

Next Steps

COMET will expand industry partnerships to enhance HSEQ data diversity and refine its AI models for improved compliance assessment. It will continue regulatory collaboration, conduct further testing, and develop a phased deployment strategy of its AI tool.

EVERCAM

Bridging the Gap Between Planned and Actual Progress with AI and Reality Capture for Safer, More Efficient Construction

Evercam

Evercam is a construction project management software company leveraging AI-driven site cameras to enhance project visibility, track safety compliance, and improve productivity through real-time oversight.

Investigation focus

The project aimed to enhance construction site safety and project management using Evercam CoPilot, an AI-driven tool integrating reality capture data. The focus evolved from safety compliance identification to comparing planned vs. actual site progress using camera footage, with implications for both project efficiency and health & safety (H&S) compliance.

Activities and collaboration

- **Tool Testing and Development:** A beta version was trialed with users, integrating feedback.
- **Integration of Safety Reports and BIM:** Historical safety inspection data and BIM models were explored to improve object recognition.
- **AI Performance Evaluation:** Assessed AI's ability to detect progress (e.g., concrete pours) and correlate with weather data.
- **User Experience Enhancements:** Improved the Evercam dashboard integration and refined AI-generated responses.

Learning and recommendations

AI-assisted safety analysis provides valuable insights but requires human oversight for validation. CoPilot performed best with trend-based operational efficiency analysis rather than object-based detection like PPE compliance, highlighting the need for further investment in machine learning models for precise event recognition. User feedback proved better data standardisation and structured metadata from regulatory bodies could enhance AI integration.

Impact

Evercam gained a deeper understanding of how AI can enhance safety and compliance in construction while validating CoPilot's analytical capabilities in real-world settings. The project strengthened industry and regulatory relationships and highlighted key areas for future investment.

Next Steps

Evercam will refine CoPilot's AI models for object-based safety detection, expand user trials, and explore commercialisation opportunities, including insurance and compliance integration.

AI-Driven Copilots for Real-Time HSE Insights, Document Automation, and Enhanced Safety Compliance

Navatech
Navatech enhances workplace safety by integrating AI and automation, using large language models (LLMs) to improve access to health and safety information via platforms like Microsoft Teams and WhatsApp.

Investigation focus

Key questions included how can AI help structure and index HSE data for third-party utilisation and how can AI assist in dynamically generating regulatory documents such as Risk Assessment and Method Statements (RAMS).

Activities and collaboration

- **City of London:** Explored AI copilots for underground utility mapping and safety observation reporting; data security concerns halted progress.
- **Digital Realty:** Tested AI for RAMS document generation and project management integration; technical feasibility was proven, but time constraints limited execution.
- **Ferrovial (Heathrow Project):** Developed an AI-driven RAMS copilot; data training challenges and indexing complexities slowed progress.
- **ACWA Power:** Integrated AI copilots with real-time weather data for safety risk assessments; validated its value for proactive risk mitigation.
- **IOSH (Stuart Hughes):** Adapted AI copilot for safety training programs, with plans for further validation.
- **HSE Integration:** Trained AI models using 60K+ incident datasets, improving accuracy by 10%; highlighted the need for structured, centralized HSE data access.
- **Open Regulation Platform (ORP):** Explored integration for real-time regulatory updates; found high potential for streamlining compliance processes.

Learning and recommendations

- **AI copilots offer strong potential** for automating safety insights and compliance management.
- **Data security remains a key barrier** in corporate adoption—solutions should align with existing IT frameworks (e.g., Microsoft Teams).
- **Automating RAMS indexing and rating** is complex but essential for improving efficiency.
- **Expanding AI training datasets** and refining feedback mechanisms will enhance performance.
- **HSE data should be open-source** and structured with metadata for easier AI integration.

Impact

Navatech successfully commercialised its AI copilots, securing two industry contracts and validating AI-powered RAMS automation, reducing manual documentation efforts. Integrating HSE data improved AI accuracy from 88% to 94%, and the expansion of conversational AI solutions into WhatsApp, Teams, and WeChat enabled real-time HSE compliance assistance.

Next Steps

Navatech will refine AI copilots for real-time compliance monitoring and expand integration into project management tools and IoT devices. It will continue collaborating with HSE, ORP, and industry partners while scaling AI training and RAMS automation for broader adoption.

Vita by Pillar

Proactively Managing Workforce Fatigue with Real-Time Data to Enhance Safety, Productivity, and Accident Prevention

Vita

Vita uses AI-powered biometric monitoring to detect worker fatigue in real-time, enhancing workforce readiness assessments and supporting safety-critical industries.

Investigation focus

Pillar's Vita app was trialled as a readiness-to-work tool to assess workforce fatigue and physical preparedness. The feasibility study focused on identifying fatigue-related risks and evaluating how real-time physiological and psychological data can improve safety, productivity, and worker retention. The six-week trial, conducted with Industry Partners, measured daily workforce fatigue and provided insights into health risks, sleep quality, and chronic fatigue indicators.

Activities and collaboration

- **Deployment and Data Collection:** Monitored 20 workers' daily readiness using physiological markers, sleep patterns, and subjective assessments.
- **Stakeholder Engagement:** Worked with Ferrovial Construction, EDF, Balfour Beatty, and HSE to explore fatigue management strategies.
- **Feedback and Refinements:** Conducted bi-weekly feedback sessions, adjusted app functionality, and introduced features such as alarm personalization and sleep entry optimization.
- **Structured Response Protocols:** Established predefined protocols for responding to fatigued workers, ensuring timely interventions.

Learning and recommendations

- **Fatigue is a Hidden Risk:** 13% of workers were in a suboptimal state daily, with 4% in a fatigued state—significantly increasing accident risk.
- **Chronic Fatigue Concerns:** Sleep problems were detected in 25% of workers, with 15% reporting low sleep duration.
- **Fatigue Impacts Productivity:** Fatigue can reduce productivity by up to 30% and increase accident risks by up to 130%.
- **Real-Time Monitoring is Critical:** Traditional assessments miss early warning signs—continuous tracking allows for proactive interventions.
- **Enforcement:** HSE should enforce workforce fatigue measurement, optimise shift patterns, and support large-scale health coaching to mitigate risks.

Impact

The Sandbox validated Vita's effectiveness in real-world settings, providing valuable industry feedback that refined its capabilities. It also helped expand partnerships with major industry players for further deployments and uncovered new commercial opportunities beyond construction.

Next Steps

Pillar will enhance Vita by developing chronic fatigue detection tools and scaling health coaching solutions to prevent fatigue-related risks. The company will continue engaging with regulators to shape best practices and expand industry partnerships to deploy Vita across multiple sectors.

AI-Powered Compliance Checking to Transform Construction Safety Through Data Standardisation and Real-Time Regulatory Assurance

Plinx and Kier

Plinx is a digital technology company that enhances safety, efficiency, and compliance in construction through connected sensors and AI-powered solutions. Their smart broker, SiteOS, integrates real-time project data with regulatory requirements to improve risk management and automate compliance monitoring.

Investigation focus

The project explored whether SiteOS, an AI-driven compliance tool, could automate real-time safety and regulatory checks in construction. The feasibility study focused on excavation activities, mapping legal requirements to project data to determine compliance gaps and highlight inefficiencies in current safety management systems.

Activities and collaboration

- **Regulatory Mapping:** Identified key legislation (e.g., Health and Safety at Work Act, CDM Regulations) and mapped requirements to project safety documentation.
- **Excavation Process Analysis:** Defined excavation workflows, assessed how regulations apply, and identified potential hold points to prevent non-compliance.
- **Data Structure Review:** Examined existing project data sources, revealing major inconsistencies in format, taxonomy, and accessibility.
- **Compliance Automation Feasibility:** Assessed whether construction data could be used for automated compliance checking; found significant barriers due to manual, unstructured, and inconsistent record-keeping.

Learning and recommendations

- **Regulatory complexity is a major challenge:** Multiple stakeholders must manually maintain compliance across fragmented systems.
- **Construction data is not easily usable for automation:** Data exists in inconsistent formats (paper, PDFs, verbal reports), making real-time compliance checking difficult.
- **Standardisation is critical:** A unified taxonomy and digital process framework is required for automation.
- **AI-powered compliance checking is possible but requires foundational changes:** Organisations must improve data structuring and accessibility before AI can be effectively deployed.

Impact

Plinx enhanced SiteOS, expanding its compliance automation capabilities. The project strengthened industry partnerships and validated the potential of AI-driven compliance monitoring. Insights gained will shape future product development and risk mitigation strategies.

Next Steps

Plinx and Kier will expand SiteOS to more construction activities, collaborate with regulators on machine-readable regulations, and standardise compliance taxonomies while refining AI-powered compliance monitoring in live projects.