BRIDGES
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Innovating for longevity: Transformative approaches to bridge maintenance

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Key Takeaways summarised by AI

- Ageing bridges demand proactive, not reactive, maintenance strategies.
- Innovation is essential — not optional — to meet long-term resilience needs.
- Predictive monitoring, AI, and smart sensors help prevent failure before it happens.
- Advanced materials like UHPC, FRP, and self-healing concrete are redefining durability.
- Procurement and client mindset are key barriers — innovation must be enabled, not resisted.

Session transcribed by OtterAI, then summarised using ChatGPT

Detailed AI Session Summary:

This session from VolkerLaser examined the urgent need to rethink traditional approaches to bridge maintenance in the face of widespread ageing infrastructure and rising external pressures such as climate change. The speaker highlighted that traditional, reactive repair methods are no longer sufficient. Instead, a proactive, predictive, and innovation-led strategy is required. Drawing on decades of experience, the presentation opened by challenging the industry's hesitance to adopt new techniques, noting the cultural and procurement-based reluctance to be “first to innovate.”Technological advancement featured heavily. The session explored smart monitoring, embedded sensors, AI-enabled modelling, and predictive analytics as core tools for modern bridge asset management.

These approaches enable targeted interventions based on risk rather than routine cycles and can extend asset life while avoiding costly or catastrophic failures. Case studies from structures like the Hammersmith Flyover and Forth Road Bridge illustrated how data-driven methods and forward-thinking clients can unlock solutions once considered impractical.Finally, the discussion turned to material innovation, showcasing high-performance materials such as ultra-high-performance concrete (UHPC), fibre-reinforced polymers (FRP/CFRP), and early-stage self-healing concrete. These materials offer superior durability and resilience, though adoption often hinges on client buy-in and procurement flexibility.

The speaker also addressed the use of drones, robotic crawlers, thermal imagery, and automated data processing as key components of an evolving maintenance ecosystem. The message was clear: meaningful innovation in bridge maintenance is both possible and necessary—but cultural, contractual, and organisational changes must also occur to realise its full benefits.

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