Knowledge access platforms for construction and maintenance

DETAILS
SECTOR | All sectors
STAGE | Project Delivery, Operations and Maintenance
TECHNOLOGIES | Workforce mobility solutions, See-What-I-See (SWIS) applications, wearables

SUMMARY
Digital knowledge platforms centralise data and knowledge and make it readily accessible to workers both onsite and in the office. This is typically in the form of engineering drawings or maintenance information. In addition to these central platforms, mobile or wearable devices, such as smart-glasses or smart-helmets, can enable quick and easy access to this data as well as facilitate See-What-I-See (SWIS) applications, where skilled specialists can share their vision in real time back to a centralised specialist or supervisor. These two elements in combination, central and mobile, allow the provision of correct knowledge to the places it is needed and at the times it is required.

These tools have been developed to reduce inefficiencies and enhance onsite safety. The centralisation of data both visual and on paper, creates a single source of truth for increased accessibility between operators and planning staff, and allows easier version control of key documents or drawings. Having a single source of truth can ensure that workers are using the right information.

In a digital age, critical infrastructure and maintenance information is still being stored and distributed through physical copies which are difficult to keep track of and not readily available onsite. To compound this, on-the-job knowledge and skills are being lost due to the aging and increasingly mobile workforce. Existing communication and knowledge transfer processes between and within large or complex teams onsite can lead to increased health and safety risks as well as productivity inefficiencies.

The overall outcome of these tools reduces project time and cost, while improving quality and safety. Knowledge access platforms will enable workers to complete projects faster, maintain quality and reduce the chance of work site safety incidents, helping save lives. Access to the correct knowledge allows workers to complete the job the first time they visit the site. Access to specialist skilled resources at a central location allows remote workers to complete the job correctly and ensure quality.

Increased research and development of mobile workforce tools and wearable technologies are decreasing costs and increasing capabilities to enable hands free and seamless access to information.

VALUE CREATED
Improving efficiency and reducing costs:
• Reduce operational costs and increase efficiency and productivity through reduced asset downtime, improved time to resolve tasks and issues, and improve first-time fix rates by having resources and support readily available
• Less material wastage
• Less travel required to and from site

**Enhancing economic, social and environmental value:**

• Decrease health and safety risks by improving access to critical project specific information, such as correct procedures, troubleshooting and support
• Enable expertise to be remotely shared to less experienced staff in real time
• Ensure expertise is not lost when personnel move sites, change jobs or retire

**POLICY TOOLS AND LEVERS**

*Legislation and regulation:* Workplace safety regulations should not prohibit the use of innovation technology that has the ability to reduce accidents. A risk-based approach can be used to ensure that appropriate measures are implemented while keeping the responsibility on project and site owners.

*Effective institutions:* Develop or establish mobile and internet networks and infrastructure allowing information to be quickly accessed onsite and in remote locations. Collaboration between government agencies such as water utilities, public health and environmental protection is needed to prevent the replication of data that can be utilised by all stakeholders and enable funding from all agencies to share risks and rewards.

*Transition of workforce capabilities:* Training and upskilling in new methods and procedures of work will enable workers to utilise new platforms and technologies effectively. Make available experienced workers who can record and share expertise and skills for various projects and tasks.
IMPLEMENTATION

Ease of Implementation
These solutions are not too technically challenging, but will require some workforce planning and organisational change to adopt new methods. The uploading of physically-located information into digital platforms can be a time-consuming task.

Cost
These are relatively low-cost solutions compared to larger infrastructure solutions. The commercially available technologies have been designed to save cost through their implementation.

Country Readiness
Developed countries are well suited to adopt these technologies with established safety and reporting standards creating a ‘ready workforce’ environment. Established internet and communications networks will be needed to handle and transmit large amounts of real time data.

Technological Maturity
These technologies are currently commercially deployed and have been in operation for a number of years. The wearables aspect is less mature than document (e.g. engineering drawings) platforms.

RISKS AND MITIGATIONS

Implementation risk
Risk: The speed and complexity of integrating legacy systems into new digital data management processes and storage platforms.

Mitigation: Data management, data standards and quality control can assist in transitioning data into new platforms. Gradual change and adequate frontline worker engagement and training during trialling and piloting activities is vital for staff to “buy in” to new technologies and successfully transition to new digital working processes.

Risk: Too much information at once - access to additional or excess information can be a distraction for the worker from the task at hand.

Mitigation: Proper procedures to find the balance between insufficient and excessive information are needed. This can be one through trials initiated by governments, or the technology developers or users.

Safety and (Cyber)security risk
Risk: Data platforms and tools need to be robust, user friendly and scalable to manage large and complex projects and meet worker expectations.

Mitigation: New platforms will need to be built so they are reliable and will also need to be secure to protect sensitive or confidential information.
### Examples

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<th>Example</th>
<th>Implementation</th>
<th>Cost</th>
<th>Timeframe</th>
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<td>Hindsite</td>
<td>Hindsite have worked with Sydney and Melbourne-based water utilities to provide knowledge management and collaboration platforms, including See-What-I-See (SWIS), which reduced the amount of time staff were required in the field[^1].</td>
<td>Benefits included 70% improved communication and knowledge transfer with error rates and personal safety issues reduced to almost zero, 88% lift in first time fix rates, 70% reduction in time, travel and delays, 83% of knowledge leaving the industry effectively captured, curated and preserved for future value.</td>
<td>Hindsite is in the early commercial stages and in developing use cases for water and adjacent industries.</td>
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<td>RedEyeDMS</td>
<td>Southern Nevada Water Authority (SNWA) started a pilot to with RedEyeDMS platform to establish “single source of truth” for engineering drawings so all personnel have the right drawing at the right time.</td>
<td>SNWA saw an increase in productivity and accessibility from using RedEyeDMS, with the time to find drawings reduced from 10 minutes to 2 minutes. This translated to 450 hours saved per month and a 20 month return on investment[^2].</td>
<td>RedEyeDMS is was fully integrated into SNWA’s existing engineering management systems within 12 months.</td>
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<td>MaintenanceTV</td>
<td>It is in use in wind turbine infrastructure maintenance organisations, connecting more than 3000 technicians from 40 countries. The cloud-based knowledge system allows for easy collection and retrieval of asset specific information through their mobile device[^1].</td>
<td>Cost benefits realised includes reduced infrastructure downtime, lower repeat call rates and reduced use of parts.</td>
<td>The project started with a 10-person demo and was rolled out to over 3000 technicians over 12 months.</td>
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[^1]: Information for this example was gathered via communications with commercial technology stakeholders.