SHAPING THE FUTURE OF OUR WATER RESOURCES

About the Hexagon Hydrology Overall (H²O) Solution
Safer, Smarter, Sustainable Water Infrastructure

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MANAGING OUR WORLD’S WATER SUPPLY FOR A SMARTER FUTURE
SHAPING THE FUTURE OF OUR WATER RESOURCES
Global issues continue to define our present and affect our future – things such as population growth, resource shortages, urbanisation and climate change, to name a few. In particular, building and maintaining adequate infrastructure is one of our most pressing challenges. That’s because communications, energy, transportation and water management systems are crucial to maintaining our way of life, and they all heavily depend upon reliable and safe infrastructure.

As with any infrastructure, water systems present huge risks. Regardless of cause – natural or man-made – a single threat can result in significant destruction. When a dam crumbles, a reservoir floods or a levee is breached, the results can be devastating, including loss of life, massive property damage or long-term environmental consequences.

It is imperative that we discover better ways to control and secure our water resources. At Hexagon, our global brand network is in the business of doing just that – working to improve the safety and reliability of the infrastructure and systems that manage our world’s water supply. By leveraging the power of Hexagon’s design, measurement and visualisation technologies, it is possible to detect and even avoid major catastrophes, helping to solve potentially deadly problems before they arise.
The Hexagon Hydrology Overall Solution – the H₂O Solution, for short – is a comprehensive water infrastructure management solution. Its integrated components are designed to improve the construction, operability and security of water management systems such as dams, reservoirs and levees, while also ensuring the safety of neighbouring communities in the event of emergency.

It is composed of total stations and sensors from Leica Geosystems and monitoring, dispatch, engineering and asset management solutions from Intergraph®. Together, they work to reduce the risk of infrastructure failure by keeping it protected and healthy as well as safeguard it against disaster through the use of real-time monitoring, early warning systems and emergency operations plans.

**Design & Construct**
- Engineering
- Detailed Design
- Procurement & Materials Management
- Construction Management
- Information Management
- Commission & Startup

**Operate & Maintain**
- Operations
- Water Management & Flood Control
- Training
- Information Management & Sharing
- Engineering & Maintenance

**Prepare & Respond**
- Emergency Management
- Response

**Secure & Monitor**
- Monitoring
- Security Management
- Incident Management
- Safety Assessment
- Risk Management
- Inspection
Whether an engineering, procurement, and construction (EPC) firm, owner operator (O/O) or emergency operations and dispatch organisation, all face countless decisions, complex work processes and difficult activities that positively or negatively influence the operability and longevity of our water infrastructure systems and their effects on surrounding communities.

Safer, smarter and sustainable water infrastructure requires optimal management across all aspects of its life cycle. The H₂O Solution is built to specifically address all of these needs, from construction and day-to-day operations to emergency preparedness and response.

From improved operation and incident preparedness to emergency response and the ability to extract, share, analyse and access vital information from anywhere at any time, systems such as the H₂O Solution are essential to ensuring a water-secure future.
THE WAY FORWARD
The water resource challenge is quickly emerging as a key risk to global economic stability and remains an issue for our world’s developing and fast-growing nations. Today, water is a central enabler of food, energy and climate security. Yet, managing water resources – dams, levees, reservoirs, power generation plants and waterway systems – in a world of rapid growth continues to pose many concerns.

When it comes to the infrastructure to manage this resource, risk of failure remains an utmost concern. Coupled with challenges relating to infrastructure system security, early warning systems and emergency response mechanisms, any situation can turn catastrophic abruptly.

The H²O Solution addresses all of these concerns, offering a smarter way to increase, control, manage and utilise this vital resource.
REDUCING RISK OF FAILURE: PREVENTING ASSETS FROM BECOMING LIABILITIES

Water infrastructure systems provide important benefits including flood protection, water supply, hydropower, irrigation and recreation. However, these vital systems can also fail without warning – and when they do, the result can be devastating.

More than 85 per cent of all dams, reservoirs and levees were built between 30 and 50 years ago. In fact, it is estimated that global infrastructure spending needs could amount to US$400 trillion over the next 25 years to repair these assets. Small to mid-sized infrastructure in remote locations is especially at risk for failure due to under-investments in maintenance.

The H2O Solution can help reduce failures in aging or poorly maintained water systems through better overall management of assets. It incorporates data in various formats such as raw data and analysed data on both 2D and 3D geospatial displays. System status alerts and messages, real-time alarms, video camera vision, document and data retrieval and mobile access enable comprehensive operational management from anywhere – the office, a central command location or the field.

Better and more accurate early warning systems enable O/Os to quickly assess problems before they happen and, in the case of unfortunate events, help to support quick response and asset rehabilitation when necessary.
SECURING INFRASTRUCTURE: KEEPING CRITICAL INFRASTRUCTURE PROTECTED AND HEALTHY
Many of our world’s dams, reservoirs, levees and other water-related infrastructure do not have adequate systems in place to evaluate risk, assess safety and prevent disasters from happening. The world needs better inspections, standard operating procedures (SOPs) and emergency action plans (EAPs) to ensure the water systems we count on every day continue to operate safely and efficiently.

Water systems require repeated physical and visual inspections that must be accurately reported to regulatory agencies. The H²O Solution aids O/Os throughout this process while easing the creation of regular and mandated updates to SOPs and EAPs. To ensure the highest degree of risk evaluation and safety assessment during inspection, specialised equipment and software support real-time monitoring and information management.
EARLY WARNING SYSTEMS: QUICK ACTION IS THE BEST SAFEGUARD AGAINST DISASTER

Warning before an event is often the difference between safety and tragedy. In recent years, the number of dam failure incidents has lifted us – and our water infrastructure – into a higher level of alert. The havoc wreaked by nature’s forces, as well as the dire consequences of human error, makes it clear that the world’s water infrastructure needs state-of-the-art monitoring around the clock to safeguard against disaster.

Early warning and alert systems within the H2O Solution help infrastructure O/Os and the surrounding community act quickly when situations arise. Involved parties can better deal with infrastructure and life-threatening events and emergencies relating to terrorism, intrusion, system failure, human error or forces of nature. Such incidents require fast response and emergency action plan management, both aided by site safety, physical security and incident response management software within the H2O Solution.
EMERGENCY RESPONSE:
MULTI-AGENCY COORDINATION IS CRUCIAL WHEN SECONDS COUNT
It is increasingly difficult to keep everyone in the loop when it comes to the myriad parties that must be able to communicate with each other instantly and reliably if a disaster should occur. Along with the O/Os themselves, other responding agencies and organisations might include federal, state and local police, fire and rescue units, hospitals and shelters, traffic management organisations, and flood incident specialists. In short, it is all about effective multi-agency coordination, communication, action and recovery. The creation of a clear, usable interface to bring together different types of data and sources is the key to dealing with disasters and effective flood management.

The H²O Solution is designed to specifically handle this complex equation, allowing various applications to communicate with each other based on rules configured by the customer. The biggest factor leading to loss of property and life is a lack of communication. The H²O Solution fills this gap, allowing people and agencies to talk to one another, minimising costs and loss of life and property when disaster strikes.
MANAGING OUR WORLD’S WATER SUPPLY FOR A SMARTER FUTURE
While current challenges help us to determine oncoming trends, the future is never a given.

There’s always room to positively affect and alter the course of change, provided we are equipped with the right information.

At Hexagon, we understand the challenges that the world’s water-related infrastructure is facing. Our H2O Solution is one of the ways we can help meet these challenges, enabling customers to better understand change, detect and monitor change before it occurs, identify risks and act with greater intelligence.