



## Structural Health Monitoring System (SHMS)

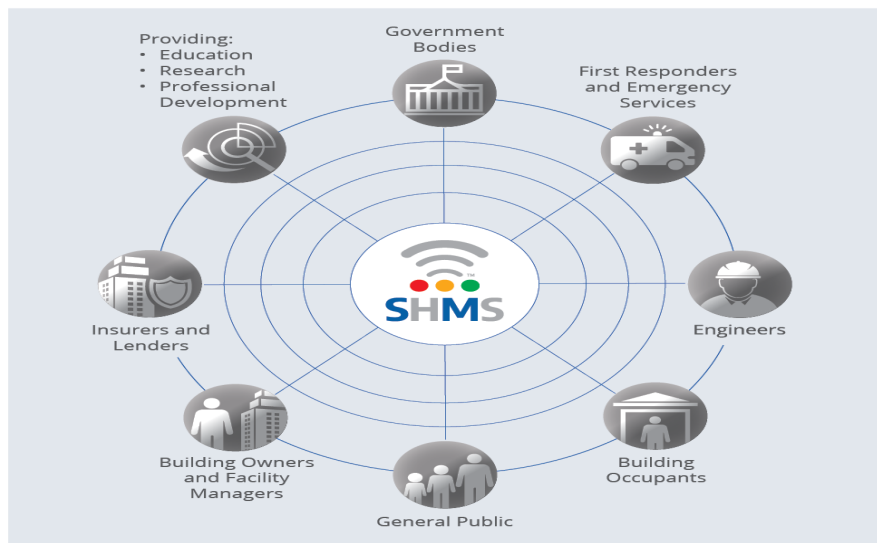
Structural Health Monitoring System (SHMS) provides valuable data and information on the movement and behaviour of buildings and infrastructure. By understanding the movement and behaviour of buildings and infrastructure, stakeholders can better prepare for and manage seismic events across the resilience index:

**Risk    Readiness    Response    Recovery**

The interlinked and interdependent stakeholders in Structural Health Monitoring Systems (SHMS) resilience are:

### Structural Health Monitoring System (SHMS)

#### STAKEHOLDERS AND BENEFICIARIES OF STRUCTURAL HEALTH MONITORING SYSTEMS



Global Seismic Data has a three-pillared approach to improving resilience in building seismic insights.

Minimise the risks faced and limit the impacts to be managed by helping build the capability and capacity in emergencies through Structural Health Monitoring Systems (SHMS).

Strengthen wider societal resilience through the introduction of digital analytics and use of big data and AI in key infrastructure, building and emergency management and evacuation routes.

## Resilience Index for our Structural Health Monitoring System (SHMS)

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### **Risk**

- Vulnerability – conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.
- Disaster risk – the potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or community in a specific period of time, determined as a function of hazard exposure, vulnerability and capacity.
- National risk – an uncertain, yet conceivable event or condition that could have serious, long-term effects on security and prosperity, requiring significant government intervention to manage.
- Residual risk – the disaster risk what remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained.
- Risk assessment – a calculation of the nature and extent of risk by analysing potential hazards and evaluating existing conditions of exposure and vulnerability to determine likely consequences.
- Risk transfer – the process of formally or informally shifting the financial consequences of particular risks from one party to another, e.g. via insurance.

### **Readiness**

- Capacity – a combination of all the strengths, attributes and resources available within an organisation, community or society to manage and reduce disaster risks and strengthen resilience.
- Disaster risk management – application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to strengthened resilience and reduced disaster losses.

- Disaster risk reduction – prevent new and reduce existing disaster risk and manage residual risk, all of which strengthen resilience.
- Readiness – knowledge and capacities developed by governments, response and recovery organisations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters.

## Response

- Disaster – serious disruption of community function following a hazardous event, interacting with exposure, vulnerability and capacity, leading to one or more of the following: human, material, social, cultural, economic and environmental losses and impacts.
- Emergency management – knowledge, measures and practices for the safety of the public or property. The planning, organisation, coordination and implementation of these to guard against, prevent, reduce, recover from or overcome any hazard or harm associated with an emergency.
- Exposure – people, infrastructure, buildings, the economy and other assets that are exposed to a hazard.
- Hazard – a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and prosperity, requiring significant government intervention to manage.
- Response – actions immediately before, during or directly after a disaster to save lives’ and property, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected, and to help communities recover.
- Resilience – the ability to absorb the effects of a disruptive event, minimise adverse impacts, respond effectively post-event, maintain or recover functionality, and adapt in a way that allows for learning and thriving while mitigating future event adverse impacts.

## Recovery

- Reconstruction – medium and long term rebuilding and restoration of critical infrastructures, services, housing, facilities and livelihoods required for the full functioning of a community or society affected by a disaster, aligning with the principles of sustainable development *and*: “Build back better”, to avoid or reduce future disaster risk
- Recovery – coordinated efforts and processes to bring immediate, medium term and long term holistic regeneration and enhancement of a community following an emergency

# Benefits of our Structural Health Monitoring System (SHMS) for you and your business

By knowing what is occurring within and to a building, or what has happened, the living and operating environment of a community is significantly enhanced.

### **Better Trust**

- The use of objective numbers as a decision-making aid
- Clarity around the best courses of action following a seismic event
- The certainty that everyone is “singing off the same hymn sheet” in structures’ health.

### **Removal of Fear and Uncertainty**

- Real-time information leading to informed ‘next steps’
- The elimination of guesswork
- ‘What you measure, you can manage’.

### **Better Ways of Protecting Life and Business**

- Improved emergency management planning and execution
- Improved buildings and other infrastructure
- Improved communication and outcomes within and across shared stakeholder interests.

A key consequence of monitoring and measuring a building’s frequency is it allows engineers and building owners to ‘surgically repair and modify’ a structure to make it safer and more resilient to seismic events.

It is only through acquiring and understanding a building’s individual reaction to seismic activity that improvements can be made to its performance during such an event.

The Seismic Data Sensor set:

- SDS units with multi-processors and multi-axis measurements to the United States Geological Survey (USGS) standards
- 3G/4G wireless communications layer
- Enterprise-class data monitoring with a rules engine and risk-scored alerting
- Cloud-based data management and storage with detailed analytics reporting via the GSDHQ web portal
- Uninterrupted Power Supply (UPS) backup
- Implementation, configuration and system support
- Quick to implement and affordably priced.

The data allows critical insights and informed decisions to be made by measuring what actually happens during a seismic event. The resulting improvements and changes made as a result of such decisions can also be monitored – allowing a virtuous cycle of enhancement and advancement to cope with seismic activity. This data is stored in the cloud for its stakeholders and is available in real time.

### **Key Points of the Structural Health Monitoring System (SHMS)**

- SHMS provides valuable data and information on the movement and behaviour of buildings and infrastructure
- A system that is low cost, low maintenance

- The system is a cost-effective solution that satisfies the most demanding applications
- System timing accuracy to 0.1 milliseconds with synchronised sampling
- Event and threshold alerting capability for any level of an event
- The system has auto diagnostic functions can be controlled remotely
- Sensor units have been calibrated and certified by independent and impartial testing agencies for accuracy
- Wireless and Ethernet capabilities
- Mobile apps – IOS and Android.

[Contact Us](#) for more information or arrange a presentation of our seismic sensors.



Website: [www.gsghq.io/contact](http://www.gsghq.io/contact)

Email: [info@gsghq.io](mailto:info@gsghq.io)