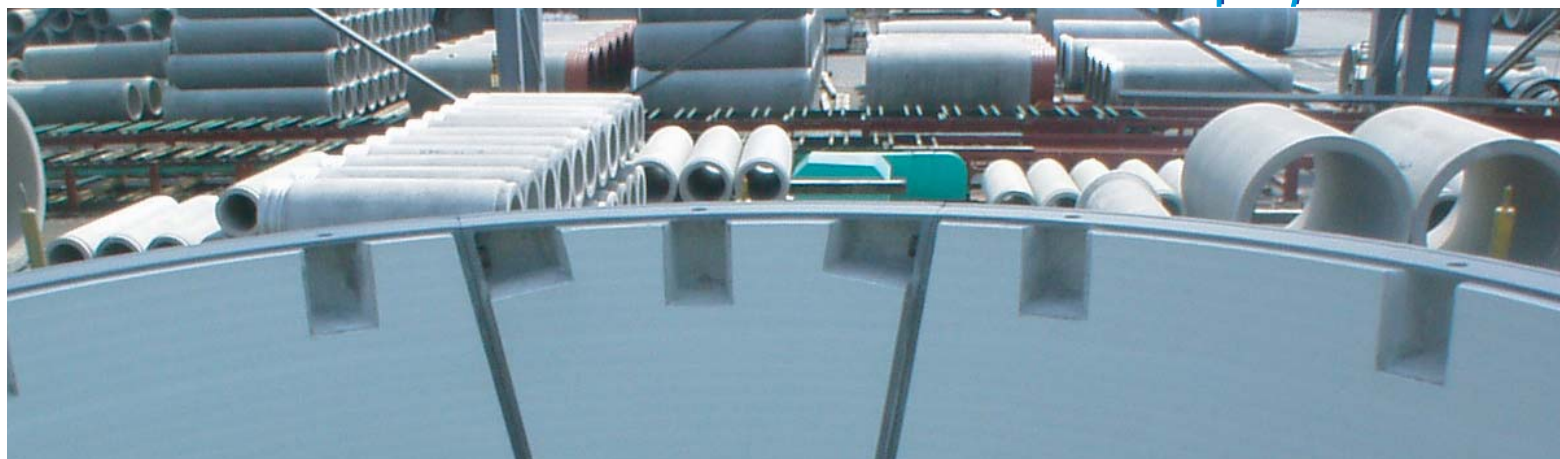


## Company Information

Company Name	GLOBAL WORKS Co., Ltd.
Representative	TOMOHIRO NITTA
Capital	600 million yen
Business Content	Plans for surveys, repairs, and reinforcement measures related to civil engineering and building structures (Appearance survey, core collection, neutralization test, EPMA, integrity test, etc.) Various concrete tests (Slump test, compression strength test, accelerated neutralization test, freeze-thaw test, etc.) Concrete anticorrosion work (A type, B type, C type, D type) Consulting business (operation planning · landscape basic design and detail design) Market research · development business support · civil engineering · building material sales · temporary employee business
Main Trading Banks	Sumitomo Mitsui Banking Corporation · MUFG Bank · The Chiba Bank · The Bank of Fukuoka
Location	〒103-0013 2F, Cosmo III Building, 2-20-7 Nihonbashi Ningyocho, Chuo-ku, Tokyo TEL 03-5623-5505 FAX 03-5623-5506
Office	Tokyo Head Office Chiba Sales Office · Osaka Sales Office · Hokkaido/Tohoku Sales Office Vietnam (Hanoi)
Related Company	Overseas concrete secondary product manufacturer ○ GLOBAL-HUNG VUONG COMPANY LIMITED Ho Chi Minh, Vietnam (South) ○ NITTA-SONG DAY COMPANY LIMITED Ha Noi, Viet Nam (North)  Overseas trading company ○ Vietchem Japan (Hanoi, Ho Chi Minh)
Main Business Partners	Asahi Koei / Wesco Co., Ltd./NJS Co., Ltd./Obayashi Corporation Kajima Construction Co., Ltd./Goyo Construction Co., Ltd./Sansui Consultant Co., Ltd. CI Kasei Co., Ltd./Seed Consultant / JXTG Energy Co., Ltd. Shimizu Corporation / Showa Co., Ltd. Design consultant New Civil Engineering Development Consultant Co., Ltd./Swing Corporation Dainippon Consultant Co., Ltd./Pacific Consultant Co., Ltd. Taiheiyo Cement Co., Ltd./Pacific Materials Co., Ltd. Central Reconstruction Consultants Co., Ltd./TC TRADING Co., Ltd. Urban Development Design Co., Ltd./Naigai Engineering Co., Ltd./Nihon Suido Consultants Co., Ltd./Nippon Koei Co., Ltd./Nippon Environmental Engineering Design Secretariat Co., Ltd.
Website	<a href="http://www.global-w.com">http://www.global-w.com</a>

## Company Information



Total support for structures that transcend generations and lead to the future  
A multi-faceted approach to environmental measures

# FOUNDATION TO FURTHER GENERATION

## The Future Is Built By Maintenance

Currently, abnormalities and deterioration of the natural environment such as global warming have been reported from all over the world, and environmental measures activities such as CO2 emission control and effective use of resources are becoming active on a global scale. Even in Japan, activities toward the realization of a recycling-oriented society are being promoted by the government, regardless of the industry. In the civil engineering and construction industry as well, measures are changing to Scrap & Build or the 3R (Reuse, Reduce, Recycle).

On the other hand, the social capital development that has been carried out in earnest since the end of the war has almost come to an end, and we are moving into an era of maintaining and managing the structures that have been built so far. For this reason, we try to reduce the burden on the environment as much as possible. We would like to contribute to society with little effort by investigating and diagnosing existing structures and consulting on measures to prolong the life of the structures.



We support the realization of 3R

Water supply and Sewer survey



Agricultural facilities survey



Bridge survey



Tunnel survey



### Research

We will survey the structure with reliable achievements and experience.

- Appearance survey (cracks, cross-section defects)
- Deterioration diagnosis of concrete (Compression strength and neutralization by core sampling, chipping survey, EPMA, salinity measurement)
- Deterioration survey of skeleton and reinforcing bars (Reinforcing bar covering, pitch, degree of deterioration, tensile strength, etc.)
- Pipeline / tunnel survey
- Waterway survey

### Repair Construction

We will support to various sites from many achievements.

- Concrete corrosion protection (Sheet lining and coating type lining)
- Water stop construction
- Pipeline repair work
- Seismic reinforcement work

### Consulting

Concrete corrosion protection, corrosion protection work

- Frame repair design (Concrete corrosion protection, frame reinforcement, water stoppage, etc.)
- Pipe flow rate improvement design
- Selection of materials used in special construction

### Others

Supports various other operations

- CAD drawing
- Technical data creation
- ISO, other certification acquisition business
- Electronic delivery business
- Business system
- Specified temporary staffing business
- Others

In addition, we support all types of investigations and diagnoses related to concrete structures. Please feel free to contact us.





## Water and Sewerage

### Water supply and Sewerage Survey

We carry out surveys and diagnoses of water supply and sewage facilities based on specialized measuring equipment and abundant experience and knowledge. We will estimate the cause, evaluate it, repair it, and consider reinforcement. We will also create and examine materials using GIS software, which are necessary for examining seismic measures for sewerage facilities.

1

#### Pipeline survey

We conduct an in-pipe survey with a camera or directly visually. In addition, we support various surveys such as neutralization depth, rebar survey, and in-pipe survey.



2

#### Manhole survey

In the manhole survey, in addition to manhole cover survey and hydrogen sulfide concentration measurement, we also support various surveys such as core sampling and rebar survey.



3

#### Treatment plants, etc

We support various surveys such as crack surveys of facility structures like sewage treatment plants, and compression strength tests by core sampling. We also continuously measures the hydrogen sulfide concentration.



## Bridges

### Bridge Survey

We will carry out bridge inspections in accordance with the Ministry of Land, Infrastructure, Transport and Tourism "Bridge Periodic Inspection Guidelines". We perform close-up visual inspection and hammering inspection (third-party damage preventive measure inspection) of each member and appendage of the bridge. Results are created according to various points.

#### Inspection status (regular inspection)

#### Inspection status (Third-party damage prevention measures)



#### Results



## Agricultural Facilities

### Agricultural Facilities Survey

We survey all concrete facilities such as open channels, pumping stations, pipelines, and headworks. We support functional diagnostic surveys for practicing stock management. We also carry out maintenance planning work as needed.

1

#### Open channel survey

We conduct various inspections such as visual inspection of appearance, compression strength of concrete, and neutralization depth.



2

#### Pumping station survey

We support appearance surveys using aerial vehicle and drones, as well as various types of surveys.



3

#### Pipeline(tunnel) survey

We conduct pipeline survey regardless of whether they are circular or rectangular.



We supports visual inspection of appearance, deflection, joints (rubber position) of internal pressure pipes, etc.

4

#### Headwork survey

We will visually inspect the appearance, investigate the compression strength, neutralization depth, etc., estimate the cause of deterioration, and propose countermeasures.



## Tunnels

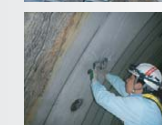
### Tunnel Survey

We support various surveys such as crack surveys in tunnels and hammering inspection surveys.

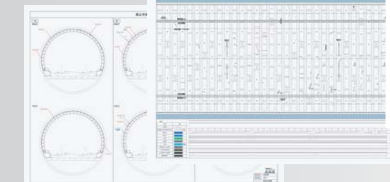
#### Tunnel survey

We conduct tunnel survey such as railroads and roads.

We support various investigations, such as cracks and water leaks, regardless of whether they are in service or not. We also measure changes over time in the tunnel interior.



#### Results



## 1 Appearance, cracks, spalling, cavity survey

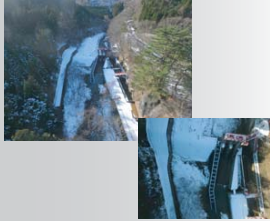
### Visual survey

Visual survey the appearance of civil engineering structures (sewerage facilities, agricultural water related facilities, bridges, tunnels, dams, etc.). We measure degradation conditions (cracks and other deformations) and display them on CAD drawings.



### Appearance survey by drone

We will use a drone to investigate areas where visual inspection is difficult.



### Appearance survey in narrow areas

We will survey narrow areas using a camera that can shoot 360 degrees.



## 2 Compressive strength of concrete

### Compressive strength test by core sampling

The core is pulled out directly from the concrete frame and the compressive strength is measured. Complies with JIS A 1107 "Concrete core sampling method and compressive strength test method".



### Compressive strength test by using rebound hammer

Estimate compression strength with Schmidt hammer. A non-destructive inspection method that does not damage the concrete frame. JIS A 1155

"Method Of Measurement For Rebound Number On Surface Of Concrete". Besides, we will respond in various ways, as a local destruction test:

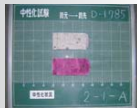
- Pull-off method
- Pull-out method
- Break-off method



## 3 Neutralization depth

### Neutralization depth by using core

The core is pulled out directly from the skeleton concrete and the neutralization depth is measured. Complies with JIS A 1152 "Method for measuring Carbonation Depth Of Concrete".



### Chipping method

The concrete frame is chipped, then the degree of corrosion of the reinforcement and the neutralization depth are measured at the same time.

Complies with JIS A 1152 "Method for measuring Carbonation Depth Of Concrete".



### Drill method

Drill a hole from the surface of the concrete frame, determine the presence or absence of coloration with drilling powder, and measure the neutralization depth.

Complies with NDIS 3419 "Neutralization Depth Test Method for Concrete Structures Using Drilling Powder".



## 4 Reinforcement Status/ Corrosion/Cover · Buried Objects

### Non-destructive Survey

Electromagnetic wave radar method, electromagnetic induction method, natural potential method

Exploring concrete frame by non- destructive inspection using electromagnetic radar and electromagnetic induction



### Chipping method

The concrete frame is chipped and the condition is measured directly.

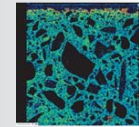


## 5 Concrete mix proportion, Chemical composition, Salt measurement

### Measurement of sulfate ion penetration depth

Indicator, EPMA

Element mapping is performed using EPMA (Electron Probe Micro-Analyzer)



### Measuring salt contained in concrete

Salt measurement method

JIS A 1154 "Test method for chloride ions contained in hardened concrete"

JCI-SC4 "Analysis method of salt contained in hardened concrete"

JCI-SC5 "Simple analysis method for total salt contained in hardened concrete"

### Measurement of hydrogen sulfide concentration

Measure the hydrogen sulfide concentration.



### Alkaline silica reaction

Alkali-aggregate reaction: Reactivity test

- Confirm the presence or absence of reactive aggregate by the mortar bar method, rapid method, or chemical method.

## 6 Measurement work

- Measurement of continuous unit water volume in cast concrete
  - Measurement of concrete surface temperature
  - Internal temperature of mass concrete
  - Length measurement
  - Measurement of concrete filling status
  - Temperature measurement in the tank
  - Measurement of tunnel inner space
  - Measurement displacement of bridge
- In addition, we support various measurement operations.



## 7 Other support (Creat diagram of step construction (3D/animation)), etc.

We will visualize complicated construction stages with 3D animation and support presentation materials.

In addition, we support various 3D creation such as landscape simulation.

