

S E R V I C E & P R O D U C T S

Concrete survey and diagnosis

Various tests are performed for structural soundness assessment of existing structures.

- **Compressive strength**(Core, Small diameter core, Rebound number)
- **Estimation of mix proportion**
(Japan Cement Association method, ICP method)
- **Estimation of the type of cement in the hardened body**
- **Neutralization**(Core, Small diameter core, Drilling method)
- **Chloride content**(Slice method, Fluorescent X-ray method, EPMA method, Diffusion coefficient evaluation)
- **Alkali-silica reaction**(Gel observation, Rock type determination, Polarization microscopy, Accelerated swelling method)
- **Precipitate/Uneven colors**(SEM, X-ray diffraction, Thermal analysis)
- **Pop-out**(X-ray diffraction, Polarization microscopy, SEM)
- **Investigation of location of reinforcing bars**
(Electromagnetic induction method, Radar method)
- **Corrosion of reinforcing bars**(Half-cell potential)
- **Air permeability**(Trent method) · **Surface water absorption test**(SWAT)
- **Structural surveys and diagnostics**

Preventive diagnosis is also available based on deterioration prediction using EPMA, SEM observation and small-diameter core sampling combined with various prediction formulae.



Bridge inspection



Investigation of location of reinforcing bars

Instrumental analysis

A variety of equipment including a powder X-ray diffractometer (XRD), thermogravimetric/differential thermal analyzer (TG-DTA), optical microscope (OM), scanning electron microscope (SEM/EDS), electron probe micro analyzer (EPMA), mercury intrusion porosimeter (MIP) and BET specific surface area meter (BET) are used for evaluation of cement, concrete and other construction materials as well as natural soils and rocks, ceramics and many other inorganic substances.

Using these analytical instruments properly, we investigate the causes of various phenomena occurring with cement or concrete and conduct chemical and mineralogical evaluations of constituent materials including cement and aggregate which are essential to diagnosis survey of concrete structures, in addition to basic property evaluation of inorganic materials.



Electron probe microanalyzer

Concrete and material tests

Various tests are conducted for many purposes ranging from evaluation of constituent materials of mortar and concrete, mixing of concrete, molding of hardened specimens, to evaluation of strength, durability and other properties.

- **Fresh concrete test**
- **Thermal properties of concrete**
(Adiabatic temperature rise, Thermal expansion, Thermal diffusion, Thermal conduction, Fire resistance test)
- **Strength tests** (compressive, flexural, tensile, shear, compressive/flexural toughness, fracture energy)
- **Volume change test** (dry shrinkage, creep, static elastic modulus)
- **Durability test**
(accelerated neutralization, salt infiltration, freeze-thaw)
- **Admixture test**
(physical test of powder, chemical composition analysis)
- **Aggregate test, Mixing Water test**



Dry shrinkage test



Adiabatic temperature rise test

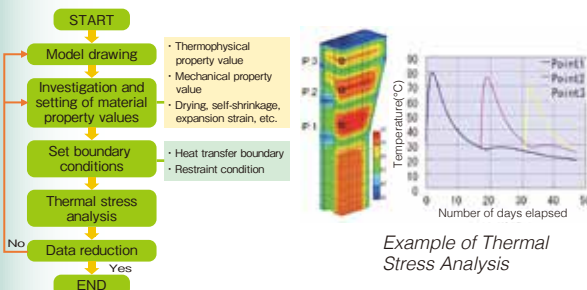
Taiheiyo Consultant is registered to Japan National Laboratory Accreditation System (JNLA) of the Industrial Standardization Law of Japan in certain fields of aggregate and concrete testings and allowed to issue test certificates with the official certification mark within the scope of registration. Details of the scope of registration are available at our web site.



Cement Concrete Consulting

Our consulting services include assistance for acquisition of various technology or ministerial certificates and crack tests by thermal stress analysis, so that your technologies will have more opportunities to be adopted and further widespread use.

- **Support for obtaining public technology certification**
Whether to adopt a new technology or product in public works is often determined depending on whether an official technology certificate is granted to it, from the viewpoint of quality and safety assurance.
- **Support for obtaining minister certification**
Using high strength concrete in the main parts of a building requires acquisition of a ministerial certificate in compliance with Article 37 of the Building Standards Act of Japan.
- **Thermal stress analysis**
With the transition to the performance test-based design system for structures, crack tests by thermal stress analysis are required even at the stage of designing. Thermal stress analysis by three-dimensional FEM is also considered very important in scoring auction.
- **Mass transfer simulation**



Thermal stress analysis flow

S E R V I C E & P R O D U C T S

Materials analysis

Through analysis of raw materials and fuels accepted at cement plants as well as analysis and evaluation of many other inorganic and organic materials, we will contribute to building a resource recycling society.

- Analysis and evaluation of chemical components (wet analysis and instrumental analysis) (Atomic absorption/ICP mass spectrometry/Ion chromatography/ Gas Chromatography Mass Spectrometry/Fluorescence X-ray, etc.)
- Analysis of organic matter and investigation of the cause of odor (Qualitative analysis of VOC, pesticides, organic matter, and odor components, etc.)
- Analysis of trace PCB and elution test of hexavalent chromium
- Soil survey and soil analysis (specified hazardous substances)
- Analysis of ceramics such as carbides and nitrides
- Quality testing of cement and admixture (Fly ash, slag, silica fumes)
- Analysis of raw materials, fuels, and recycled resources received from factories



Quantitative analysis (volumetric analysis)



Trace elements analysis

Environmental measurement and analysis

Safe living conditions are essential to our healthy life. Our company always supports to create a safe and secure environment through various environmental analyses.

-Environmental analysis test items-

- Exhaust gas measurement
- Water-pollution measurement
- Soil survey
- Noise measurement and Vibration measurement
- Working environment measurement
- Odor measurement
- Waste survey
- Asbestos measurement and analysis
- Sick house measurement
- Dioxin measurement and analysis



Working environment measurement (mineral dust)



Gas chromatograph-mass spectrometer



Water-pollution measurement

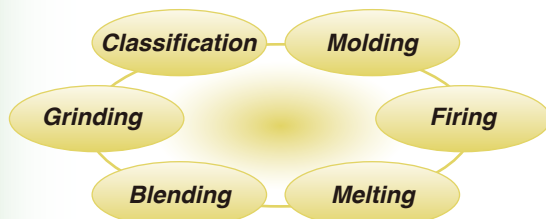


Exhaust gas measurement

Commissioned processing of inorganic powders

Our commissioned services include powder processing using a variety of specialized equipment, in quantities of several kilograms to several tons as requested by customers. Quality assessment of products using analyzers can be also supplied.

- Various test production results
- Accumulated abundance of know-how
- High-quality processing design
- Examination of processes for mass production
- Estimation of manufacturing cost



Tube mill



Test kiln

Research and products related to the treatment and disposal of radioactive waste

• **Research**

As a contribution to safer treatment and disposal of radioactive waste, commissioned research including various surveys, testings and evaluations is available about treatment and disposal using cementitious materials.

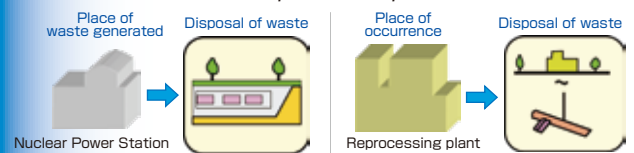
Our activities also extends to effective use of a large amount of waste concrete generated from decommissioning of nuclear power plants.

• **Product**

Based on our accumulated technologies and research results related to radioactive waste treatment and disposal, many products for radioactive waste treatment and disposal have been developed and delivered. Our products satisfy needs of customers in the field of waste treatment and disposal with high reliability.

- Solidifying material (Premix cement, Semegara Bond, Low Alkali Cement)
- Shielding materials (high-hydrogen cement, boron-containing mortar)
- Containers for processing and disposal (steel rectangular containers, PIC containers)

Disposal concept



Low level: Soil cover over 3m
Intermediate depth:
50 to 100 m underground

Geological disposal (high level and part of TRU): Ground layer deeper than 300 m underground