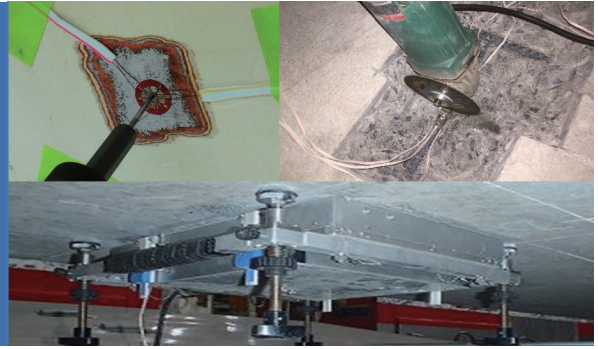


Specialized stress measurement technology

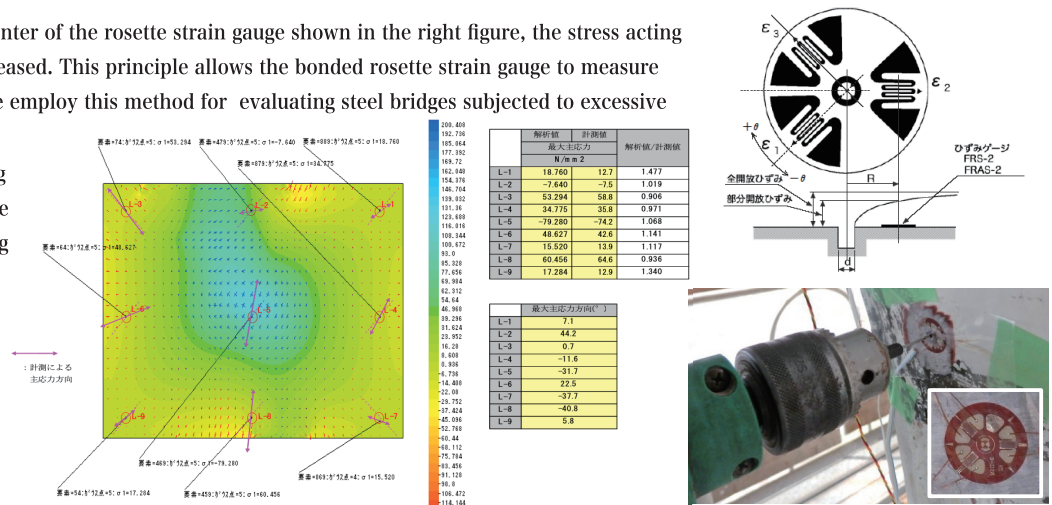
Residual Stress Verification of Steel and Concrete Structures Based on the Principle of Stress Relief



At Josei, we conduct residual stress verification on steel and concrete structures using measurement techniques based on the principle of stress relaxation to verify the safety performance of structures affected by forced deformation.

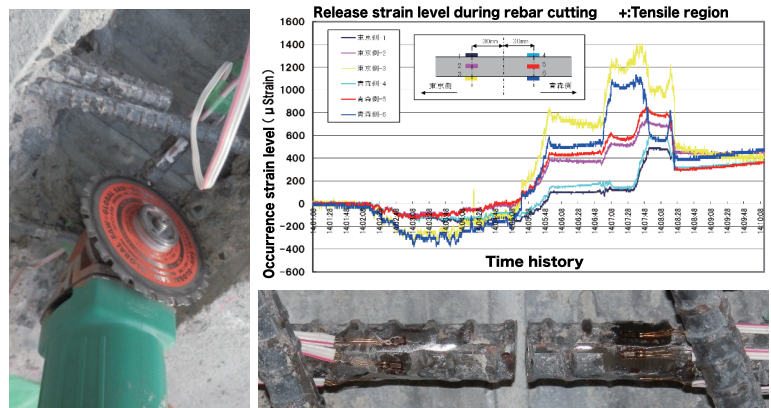
Verification of Residual Stresses in Steel Structures Using the Punching Method

By drilling a hole at the center of the rosette strain gauge shown in the right figure, the stress acting near the drilling site is released. This principle allows the bonded rosette strain gauge to measure surface strain. At Josei, we employ this method for evaluating steel bridges subjected to excessive displacement effects from collisions and for assessing stresses in steel girders due to dead loads. By analyzing triaxial strains using rosette analysis, we can determine the principal stress directions, which effectively validates the subsequent FEM analysis model.



Verification of Residual Stresses Using Reinforcing Bar Cutting Methods

The rebar cutting method involves chiseling out the rebar within concrete, symmetrically bonding strain gauges relative to the cutting position, and conducting measurements before and after rebar cutting to verify residual stress from the released strain. To date, Kamiharu has conducted numerous measurements to determine rebar stresses induced by ASR expansion, assess residual prestress in PC bridges, and evaluate the load-bearing capacity of concrete bridges affected by earthquakes.



Verification of Residual Stresses Using the Slit Method

The measurement principle involves cutting a slit perpendicular to the applied stress direction on the surface of a concrete member subjected to uniform stress, then analyzing the resulting free strain around the slit using digital image correlation. A key feature is the use of a dedicated line sensor scanner-type full-field strain measurement device for image capture. Josei effectively utilizes this method to gather foundational data for the restoration design of PC bridges.

