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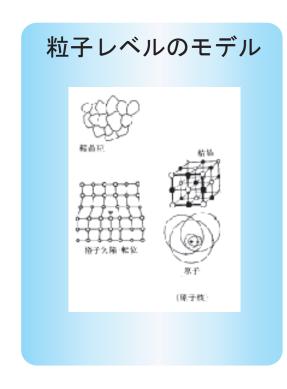
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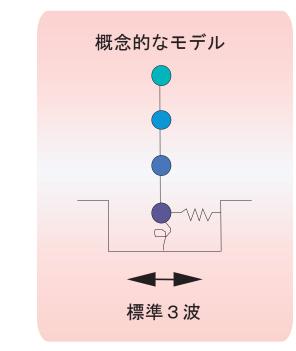
## 研究のコンセプト

ままにモデル化し,物体内の変形や力 の加わり方を調べる方法です. したが って、目に見えない微細な構造までは fine structure models or schematic 扱わず、同時に実際の形と異なる質点 系のような概念的モデルも扱いません dynamic response analysis. We rely on . 現在研究対象とする上部構造には, continuum mechanics to study the 組積造歴史建築物および鉄筋コンクリ behavior of masonry structures and ートシェルが、地盤構造についての研 reinforced concrete shell structures. 究には表層地盤構造および入力地震動 のモデル化があります. いずれについ ても, 微動測定を用いた実証的な研究 を行っているのが特徴のひとつです.

## Concepts

連続体力学とは、構造物を目に見える Continuum mechanics is a method to model structures as the way they are and to study deformations and forces in the body, avoiding either invisibly models like spring-mass system in At the same time, soil is also modeled as continuum to study modeling method for subsurface structures and input earthquake ground motion. One of the common features for these studies on superstructures and soil is to utilize micro-tremor measurement as a positive measure for modeling.







## 微動の利用

微動とは、潮汐、波浪、風、交通、 場、歩行等により生じている、地盤あ るいは構造物の無感の振動です. 微動 の振幅や振動数を制御することはでき ませんが、実験のための加振源を用意 する必要が無いので、安価で簡易な実 験が可能となります. 微動計と呼ばれ る機械を測定点に置き、高精度で加速 度を測定することにより、構造物の揺 れやすい振動数や変形性状、振動の減 衰性がわかります. 地表数点で同時に 観測するアレー観測により、表層地盤 構造に固有な波動伝播速度を分析し、 構造のモデル化に役立てることができ ます.

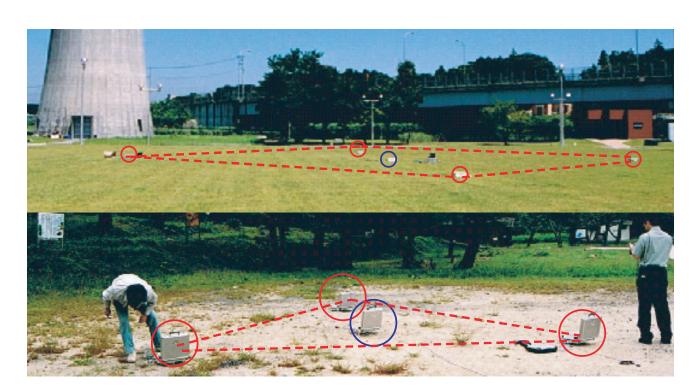
## Micro-tremor measurements

Micro-tremor is unnoticed motion of ground or structures which may be caused by tides, ocean waves, winds, transportations, factory machines, man-walking, and so on. Since equipments for excitation are not necessary in measurements, simple and inexpensive experiments can be carried out, though we have to resort to uncontrolled vibration in terms of level and frequency contents. We can deduce predominant frequencies and corresponding modes as well as damping characteristics by measuring micro-tremor accelerations. We can also utilize micro-tremor array observation, a simultaneous multipoint measurement, for subsurface modeling by analyzing associated wave propagation velocity.

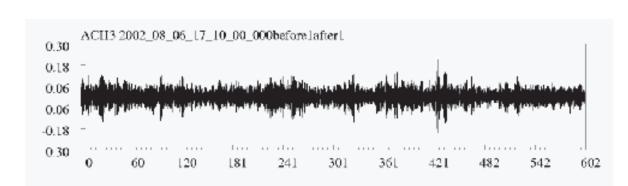




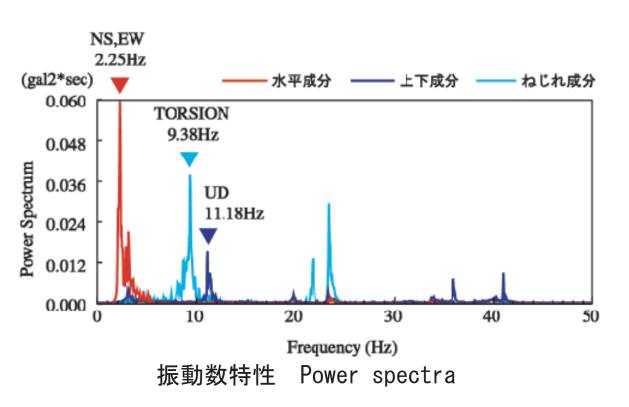
Portable seismograph and external sensors

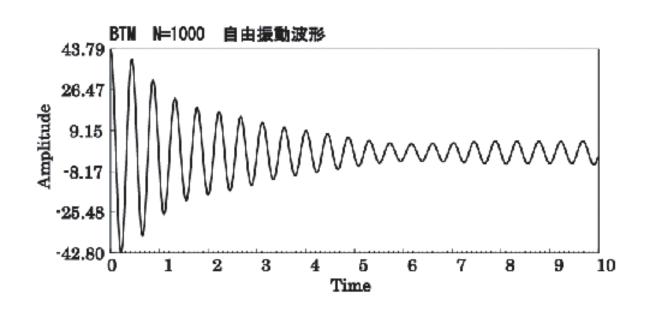


微動アレー Micro-tremor array measurement



微動波形例 Micro-tremor waveform





RD法による自由振動波形 Synthesized free vibration waveform by RD method