SAKAMOTO LAB.

[Measurement and Evaluation of Sound Environment in Urban City]

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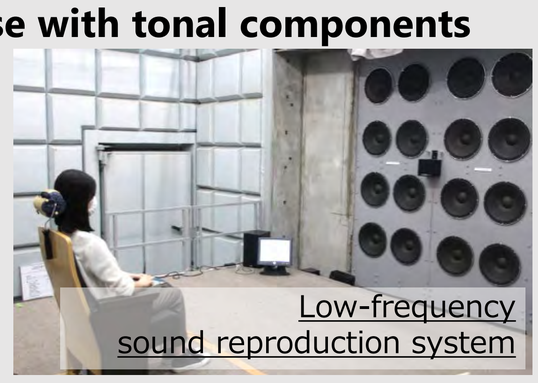
To realize a better sound environment

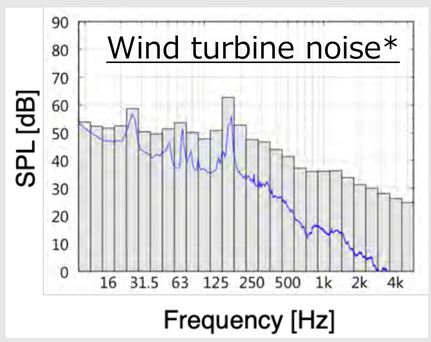
Sounds surround our lives. Sakamoto laboratory treats various issues on acoustic control, measurement, prediction and assessment, in order to realize better sound environment. Evaluation and measurement of acoustical environment will be introduced.

- **Room acoustic design**：Acoustical design of auditoria, Speech privacy, Classrooms acoustics
- **Building acoustics**：Sound insulation of building façade
- **Acoustic measurement**：Impulse responses, Sound insulation, Sound reflection and absorption
- **Development of prediction methods**：Numerical analysis
- **Development of sound field simulation**：6 channel recording-reproduction system
- **Subjective evaluation**：Concert halls, Living environments, Public spaces, Offices, Healthcare facilities, other small spaces such as a car cabin
- **Environmental noise**：Prediction model of road traffic noise, Wind turbine noise, Equipment noise

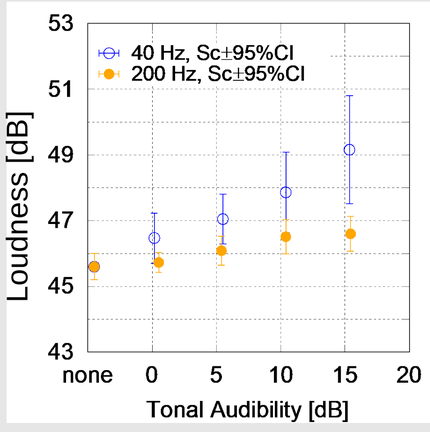
Subjective evaluation of noise with tonal components



Low-frequency sound reproduction system

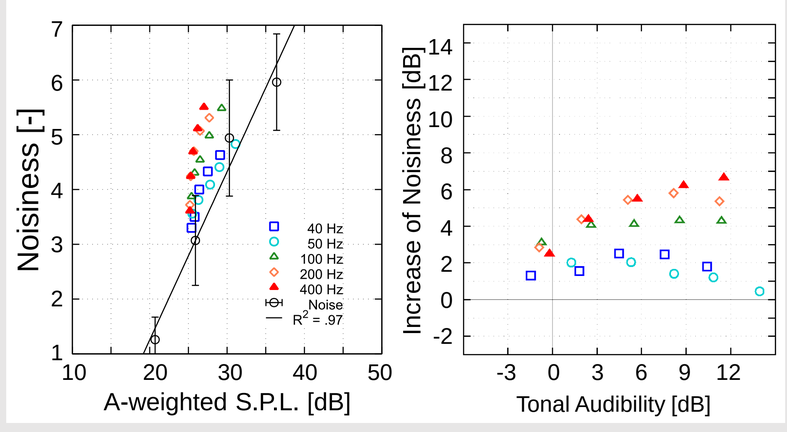


Tonal components in environmental noise may increase the annoyance to the noise. Auditory experiments are conducted to know how the frequency characteristics affect the subjective perception such as noisiness.



Loudness evaluation

Increase of loudness depends on the frequency and strength of tonal components, and the type of background noises.



Noisiness evaluation

The effect of tonal components on noisiness was evaluated by comparing the noisiness of the tonal noise to that of noises without the tonal components.

Audio-visual interaction for evaluation of environment

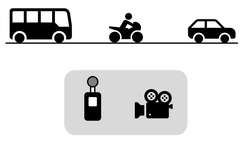
Audio-Visual reproduction system

Three-dimensional sound field reproduction system using 6-channel loudspeakers has been build in anechoic room. Audio-visual interaction on evaluation of environment is investigated using combination system of 6-ch. loudspeakers and dome projector.

The effect of visual stimuli on the subjective evaluation were studied under various sound sources and listening situations.

Prediction and evaluation of road traffic noise

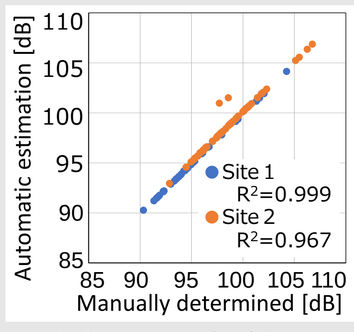
Development of automatic data processing



- Measurement
  Video camera
  Sound level meter
- Auto processing
  Event detection
  Running speed
  Vehicle type classification
  Sound power level

Our laboratory contributes to developing Japanese road traffic noise prediction model. This research proposes an automatic data processing method for evaluating the sound source using image processing and machine learning.

in-situ measurement



Estimation result of PWL

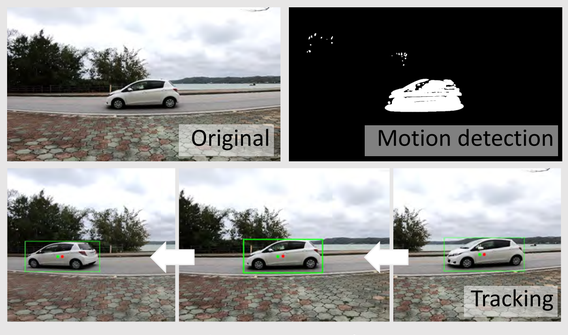


Image processing