



# SWE-SSRT

Seismic While Excavating using  
Shallow Seismic Reflection survey for Tunnels



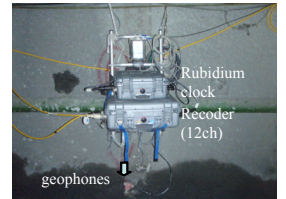
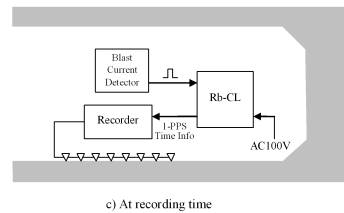
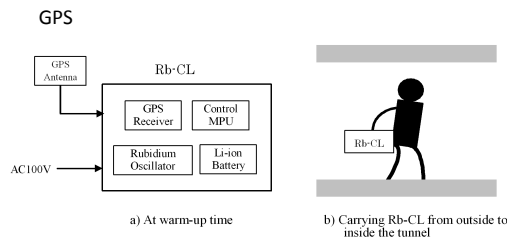
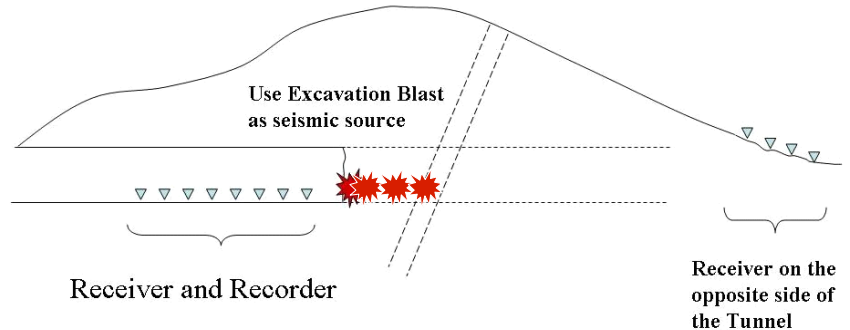
## Summary

### What is the SWE-SSRT?

■ SWE-SSRT uses the excavating blasts in multiple-steps as the seismic source which allows the continual survey and prediction of tunnel geological conditions while excavating.

The 13th Infrastructure Technology Development Award 2011- excellence prizes -

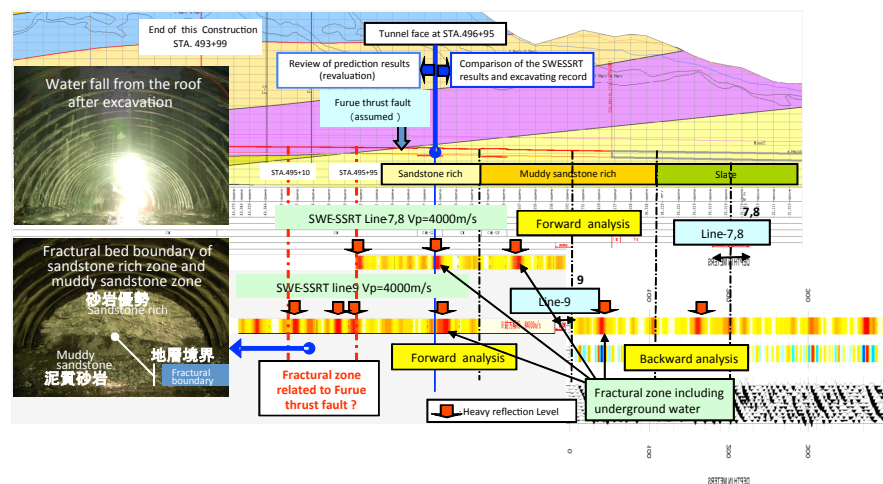
## SWE-SSRT method



Time recording device inside tunnel using a Rubidium clock

## Characteristics

- Seismic source is the excavating blasts (about 250 milliseconds delay)
- Continual survey and prediction ahead of tunnel face without interruption of tunnel excavating work
- A GPS time signal transmission device and Rubidium atomic clock are used to synchronize the equipment internal clock
- The cost is about half that of the previous method



Example of SWE-SSRT results and geological revaluation on Furue-Minami tunnel

## Track record

- SWE-SSRT: 5 tunnels
- Conventional SSRT in tunnel: 11 tunnels (including TBM)
- Conventional SSRT from outside of tunnel: 5 tunnels