

# THE SELF-COMPACTING CONCRETE TUNNEL LINING SYSTEM

## Current problems in tunnel lining construction

FACTORS	Social structure, Working environment	Material quality, Construction defect
PROBLEMS	Aging society, Shrinking workforce, Lack of skilled worker	Initial defects (segregation, poor filling, surface air voids, etc.)

DEVELOPMENT POLICIES

Simplification of the Construction Procedures

Prevention of Human Error and Lack of Workmanship

SOLUTIONS

*adopted*

Self-Compacting Concrete (SCC)

*adopted*

Pressurized Filling System

Save labor and manpower

The self-compacting concrete tunnel lining system, which has been improved by our company, makes quality improving as well as labor and manpower saving. It is leading to automated tunnel lining construction.

## FEATURES OF NEW METHOD

### Feature 1 The Compaction of Concrete by Vibrator is not Necessary

SCC makes labor and manpower saving and improve working environment since no vibratory compaction work is required.

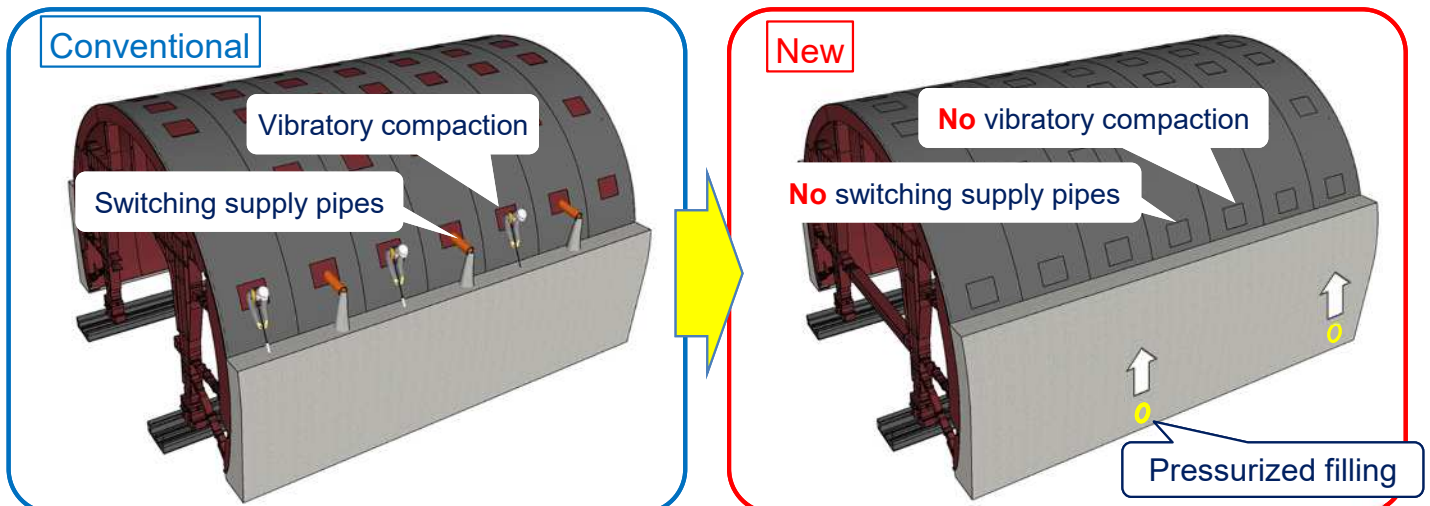
### Feature 2 Switching Concrete Supply Pipes is not Necessary

Pressurized fitting method from the bottom of tunnel lining formwork makes labor and manpower saving since no switching pipes is required.

### Feature 3 Initial Defects will not Appear

The two methods mentioned above can eliminate initial defects which are a segregation by excessive vibration, poor compaction, or surface air voids, and these make quality improving.

## CONVENTIONAL vs NEW METHOD



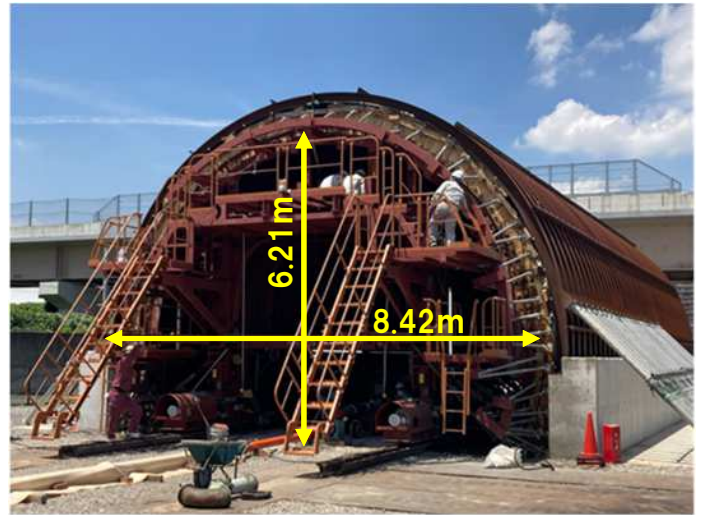
Figuer-1 Comparison of conventional and new construction methods

# EXPERIMENT

Information of the full-scale experiment conducted on testing ground in Sato Kogyo Technology Centre



Picture-1 Situation of the full-scale experiment



Picture-2 Tunnel lining formwork



Picture-3 Injection slot



Picture-4 Situation of SCC pressurized filling

# ACHIEVEMENT

We applied this new method to *Ashize Tunnel (Nagano Prefecture Iida Construction Office)* in 2023.



Picture-6 Situation of Filling Concrete (Conducted by only 3 workers)



Picture-7 Surface Appearance (From inside)