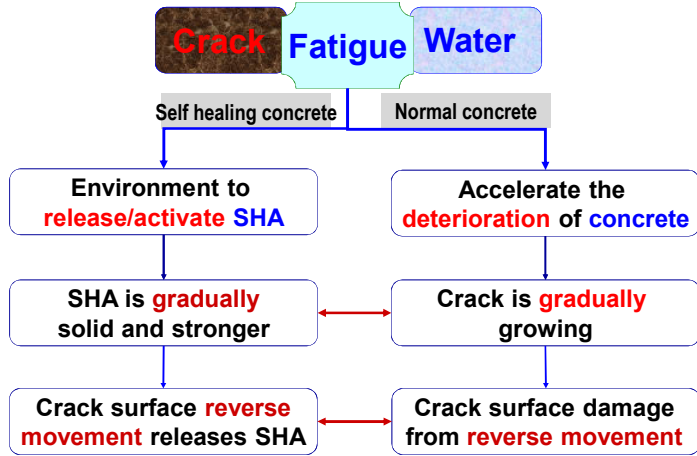


# Structural performance of self-healing concretes subjected to fatigue loading

KISHI Lab

## [CONCEPT]



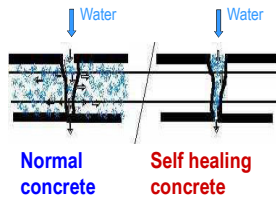
Self healing technology may improve the performance of concrete subjected to Seismic Loading

## [BACKGROUND]

- Water rapidly squeezes out from crack due to the opening and closure and thus degrades crack interface of concrete.
- Degradation of shear stiffness due to the initial imperfection was found.

## [SOLUTION] – SELF HEALING TECHNOLOGY

SH products are created by the activation of SH additives, and is compacted to solid layer due to the crack closure action.



## [EXPERIMENTAL PROGRAM]

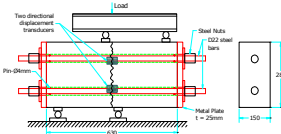
Low cycle uni-axial test

[Objective]: To detect the existence of SH solidification layer.



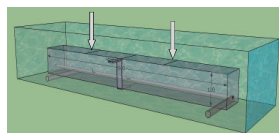
Shear fatigue test

[Objective]: To detect the contribution of SH products when they are released by reverse movement of crack surfaces.



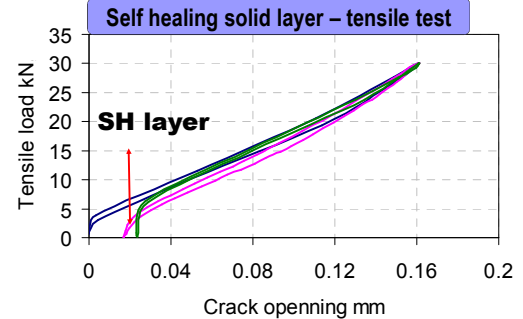
Flexural fatigue test

[Objective]: To investigate the contribution of SHC in increasing the life span of concrete members.

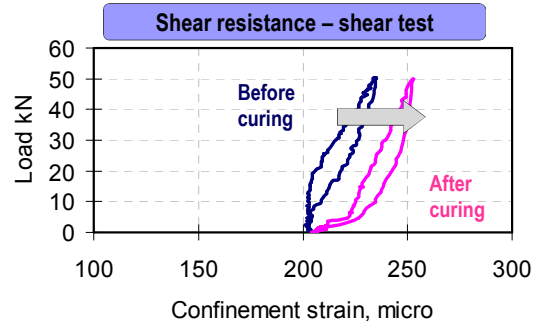


SHA – Self healing additive, SH - Self healing

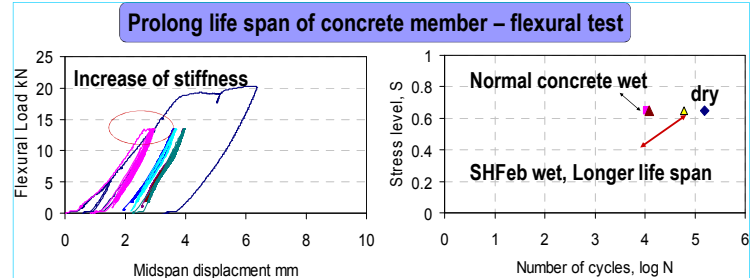
## [EXPERIMENTAL RESULTS]



Thickness of SH layer after curing is around 10µm in each surface. Solid layer is overlapped by new layer by further curing.



Increase of confinement is observed at early stage, larger contact area between crack surfaces is expected.



- Increase of stiffness is observed at early stage.
- New type SHC shows remarkable effect in decreasing degradation of concrete member.

## [CONCLUSIONS]

- Self healing solidification layer is observed when crack closed after curing.
- Under the reverse movement of concrete interfaces, the self healing products are released and activated inside the crack.
- By providing Self healing solid layer to the crack surfaces of concrete, the degradation of concrete surface subjected to seismic loads is reduced.