

## ABSTRACT

Ultra-High Performance Concrete (UHPC) is a concrete that is very strong and durable. Low water binder ratio in UHPC can cause negative effects in the form of autogenous shrinkage which can cause early age cracking in UHPC. Shrinkage Reducing Admixture (SRA) is commonly used to reduce this shrinkage, but SRA also have negative impact on UHPC. adding SRA can reduces the compressive strength of UHPC, because SRA can increases air content in the mixture. This study examines whether adding an antifoaming agent together with SRA can help recover the lost compressive strength while still reducing shrinkage.

Three UHPC mix designs were prepared and tested: a control mixture without any admixture, a mixture with 1% SRA, and a mixture with 1% SRA and 0.14% antifoaming agent. The three mixtures were tested for flowability, 7-day compressive strength, and autogenous shrinkage over 48 hours after demolding.

The results showed that adding 1% SRA reduced flowability by 19%, from 245 mm to 198.7 mm, and reduced 7-day compressive strength by 7%, from 139 MPa to 130 MPa. However, SRA also reduced the peak autogenous shrinkage by 38.5%, from 265  $\mu\epsilon$  to 163  $\mu\epsilon$ . When 0.14% antifoaming agent was added to the control mix design with the addition of SRA, the sample experienced a decrease in peak autogenous shrinkage to 131  $\mu\epsilon$ , which means 50.6% lower than the control mix design without any additional additives. The compressive strength of mixtures with SRA added with antifoaming agent also increased from 130 MPa to 134 MPa. The flowability decreased when compared to other mixtures to 187.5 mm.

The research results show that the combination of SRA with an antifoaming agent in a UHPC mixture can reduce autogenic shrinkage and partially restore compressive strength compared to the use of SRA only. However, the dosage of the antifoaming agent still needs to be studied further so that the optimum mixture can be obtained to create a UHPC mixture with the addition of SRA without experiencing a decrease in compressive strength.

**Keywords:** Ultra-High Performance Concrete, Autogenous Shrinkage, Shrinkage Reducing Admixture, Antifoaming Agent, Compressive Strength, Flowability.