

Elastic properties of Icelandic concrete

The scope of this project is the elastic properties of Icelandic concrete. The main focus is on determining the modulus of elasticity (Young's modulus) and Poisson's ratio. Recent preliminary research in this field suggests that current information on the modulus of elasticity needs to be researched further. As for Poisson's ratio, no information on any research regarding it has been discovered, for Icelandic concrete.

Research done some 12 years ago (Rb rapport nr. 99-09) suggested that the modulus of elasticity was somewhat less than that prescribed in the standard valid at that time (FS ENV 1992-1-1:1991). Hence, the Icelandic National Annex allowed for the value stated in the code to be lowered by 10 or 40%, depending on how absorbant the Icelandic aggregate was to water. The preliminary research mentioned above suggests a decrease in the range of 10-20%.

A literary study of published material is a part of the project. The main purpose of the study is to gather information regarding various material models used to simulate different types of concrete and its ingredients. When the theoretical background for various models is known, the model deemed most appropriate will be selected. That model will then be adapted to simulate Icelandic concrete.

Experimental work will be done in order to obtain necessary data for modulus of elasticity and Poisson's ratio. This work consists of dynamic compressive testing in order to get data on stress and strain. But the relation between the two is the modulus of elasticity (Hooke's law). Measurements of strain are also used to obtain data on Poisson's ratio.

The parts stated above are to be assembled to form a clear and comprehensive guide to what the elastic properties Icelandic concrete are. The literary study should prove helpful in regards to where the theory of elasticity for materials came from, where it is today and where it should head. Finally, the results of the experimental work could be used as a backbone for the revision of the Icelandic National Annex.