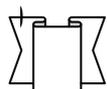


Abstract

This thesis is studying the utilization of poly –styrene granules to produce insulating low –density concrete to minimize the energy spent in cooling and heating systems which are highly affecting the projects costs especially when the local climate of Iraq is too sever either in summer or winter . This makes the thermal profing of walls and roofs to be in competent upon .

In this research trial mixes of concrete containing cement and poly-styrene granules was puting into effect to achieve a concrete of (243-731) kg/m³ density –Relation ships between the mix proportions and cement content and water / cement ratio have been created to be employed in designing the poly – styrene concrete mixes.

The experimental part of this study can be apporioned into two groups ; a concrete mixes of (243-550)kg/m³ density using concrete and poly-styrene are recorded as group one and a concrete mixes of (356-731) kg/m³ using poly-styrene granules and crumbs are listed under group two . The physical properties investigated included “ density ,compressive strength ,thermal conductivity coefficient, ultrasonic waves acoustic impedance dynamic modules of elasticity , electrical resistivity and the porosity have been executed . In this study the concrete samples have been cured in a short time by leaving out for hours in air and immersion it in water of 50c for 24 hours , together with covering them by greased glass plates to prevent the water entry and enhancing the physical properties . This method ensures



the achieving of high early strength to enable the demoulding and handling of concrete products shortly after casting .

The analysis of results detected that there is an inverse relation between density and poly-styrene crumbs . on the other hand the thermal conductivity coefficient is related directly with density and inversely with both of dynamic modulus of elasticity and acoustic impedance .

The compressive strength of poly-styrene concrete decreases by increasing water/cement ratio and increases by increasing density .

A speed ultrasonic waves depending greatly on the density which is increased directly and also there is a direct relation between dynamic modulus of elasticity and both of density and compressive strength .

The tests clarified that the acoustic impedance increases directly with compressive strength whereas the electrical resistivity depends on the density and compressive strength . Also the relation between porosity and acoustic impedance can be inversely drew .

Finally poly-styrene concrete can be considered as a good electrical insulator and its qualification of sound insulating is better than ordinary concretes .

