Since the 1950, several techniques of prefabrication and pre-casting have been developed. The composite concrete-concrete construction, as one of these techniques, has been more and more employed. In the composite construction, the pre-cast concrete acts in conjunction with the cast-in-place concrete, usually of lower quality than the former, to form what is termed “composite section” the pre-cast units may be either of reinforced or prestressed concrete. The employment of composite concrete elements leads to considerable economies, since, like pre-cast elements, they require no forms or shuttering. At the same time, the cast-in-place concrete binds the individual pre-cast units together providing the monolithic nature.

The cost of the cast-in-place elements is also lower than that of the pre-cast one. Thus, composite concrete elements have the main advantages of both pre-cast and monolithic reinforced concrete.

One of the most common types of the composite concrete elements is the pre-slab which is used extensively in the construction of both buildings and bridges. It consists of a pre-cast concrete layer serves as a form or skeleton for the cast-in-place layer. At the same time, main reinforcement is usually located in the pre-cast units. The pre-cast units can be easily made, transported, and erected.

In this thesis, experimental tests were divided into two parts. First was testing of push-off specimens consists of two parts cast at different times and subjected to compressive stresses normal to the shear plan, and the second was reinforced concrete continuous one way composite pre-slabs.

Push-off specimens discuss different types of interface connections between the old and the new parts, such as roughening of interface surface, creating of concrete keys, using of steel dowels and painting the surface with binding materials.

Also discuss some factors affecting the shear transfer capacity, such as concrete compressive strength and the level of stress normal to the shear plane.

The most effective parameters were used in the treatment of the interface of tested composite pre-slabs.

1.2) Objectives:

The main objectives of this research can be summarized as follows:

1- Study the shear transfer across interface in composite concrete-concrete sections subjected to stresses normal to the shear plane using push-off specimens.

2- Suggest a model used to predict the ultimate shear transfer capacity of Pre-Slabs.

3- Study the actual behavior of one way - two span continuous composite pre-slabs supported on 3 edges. This was achieved by testing pre-slabs with different interface treatment.

4- Theoretical analysis of composite pre-slabs using F.E.M. with the help of the push-off specimens test results.

5- Comparing the theoretical analysis with the experimental results to acsses the validity of the modeling.