

HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING COURSE

DIPLOMA PROJECT

FORMWORK TO REINFORCED  
CONCRETE STRUCTURES

C/916

GEORGIU ANDREAS

JUNE 2000

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NICOSIA CYPRUS**

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# 1. INTRODUCTION

## 1.1 Safety of formwork

The failure of formwork is a major concern of all parties involved in a construction project, the owner, the designer, and the contractor. It's the responsibility of each designer of formwork to ensure that the forms are designed adequately. This requires a careful analysis of the job conditions that exist at each jobsite, a determination of the loads that will be applied to the formwork, and the selection and arrangement of suitable forming materials that have adequate strength to sustain the loads.

It's the responsibility of the workers at the jobsite to fabricate and erect the formwork in accordance with the design. A careful check of the design and inspection of the work during construction are necessary to ensure the safety and reliability of the formwork.

Safety is everyone's responsibility and all parties must work together as a team with safety as a major consideration.

## 1.2 Economy of formwork

Economy should be considered when planning the formwork for a concrete structure. Economy involves many factors, including the cost of materials, the cost of labor in making, erecting, and removing the forms and the cost of equipment required to handle the forms.

Economy includes also the number of reuses of the form materials, the possible salvage value of the forms or use elsewhere, and the cost of finishing concrete surfaces after the forms are removed. A high initial cost of materials, such as steel forms, may be good economy because of the greater number of uses that can be obtained with steel forms.

## 1.3 Care of forms

Forms are made of materials which are subject to considerable damage through misuse and mishandling. Wood forms should be removed carefully then cleaned, oiled, and stored under conditions that will prevent distortion and damage.

## 1.4 Allowable Unit Stresses in Material Used for Formwork

In order to attain the maximum possible economy in formwork, it is desirable to use the highest practical unit stresses in designing forms. A knowledge of the behavior of the pressures and loads that act on forms is necessary in determining the allowable unit stresses.

When concrete is first placed, it exerts its maximum pressure or weight on the restraining or supporting forms. However, within a short time sometimes less than 2

hours, the pressure on wall and column forms will reach a maximum value, then it will decrease to zero. Thus, the forms are subjected to maximum stresses for relatively short periods of time.

As far as beams slabs and girders concerned the concrete begins to set and to bond with reinforcing steel within a few hours after is placed so as to support it self. Although the forms are usually left in place for several days, the magnitudes of the unit stresses in the forms will gradually decrease as the concrete gain strength. Thus the maximum unit stresses in the formwork are temporary and of shorter duration than the time the forms are left in place.