Using Maturity to Predict Girder Camber

by

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(ABSTRACT)

The objective of this research was to determine if differential camber of prestressed concrete girders could be reduced by accurate prediction of initial camber at release of prestress. Maturity at prestress transfer was used to calculate modulus of elasticity for predicting camber at release. The research consists of a literature review of maturity methods, testing of a standard concrete mix to determine strength and modulus functions and measurement of girder camber and maturity.

Both the Nurse-Saul and the Arrhenius maturity models were evaluated. Maturity relationships were developed for concrete mixes containing Type II and Type III cements. A relationship of modulus as a function of maturity was developed. Seven girders were tested. Camber predictions within 0 to ¼ in. of actual camber were obtained using modulus of elasticity calculated from a maturity based function. Comparison was made between maturity based modulus and standard strength based modulus models. Camber predictions based on modulus calculated based on field cured cylinder strengths were within 0 to ½ in.
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# Table of Contents

## Chapter 1- Background

1.1- Project Overview and Scope

1.2- Project Objectives

1.3- Project Organization

## Chapter 2- Literature Review

2.1- Camber in Pretensioned Concrete Beams

2.1.1- Differential Camber

2.1.2- Modulus Calculation Models

2.2- Maturity Method for Estimating In-Place Strength

2.2.1- Theory, History and Models

2.2.2- Maturity Measuring Equipment

2.3- Significance of Research

## Chapter 3- Test Procedures

3.1- Introduction

3.2- Estimating Concrete Strength Using The Maturity Method

3.2.1- Materials

3.2.2- Determining Rate Constants

3.2.2.1- Preparing Mortar Batches

3.2.2.2- Curing Mortar Cubes

3.2.2.3- Mortar Cube Strength Tests

3.2.3- Development of Strength versus Maturity Curves

3.2.3.1- Preparing Concrete Batches

3.2.3.2- Curing Concrete Cylinders

3.2.3.3- Concrete Cylinder Strength Tests

3.2.3.4- Concrete Cylinder Modulus Tests

3.3- Girder Tests

3.3.1- Maturity Measurement

3.3.2- Camber Measurement
# Table of Contents

**Chapter 4- Background**

- 4.1- Introduction .......................................................... 24
- 4.2- Maturity Method Strength Estimates ............................... 24
  - 4.2.1- Maturity Function Constants .................................. 24
  - 4.2.2- Maturity Models .................................................. 27
    - 4.2.2.1- Strength Models ............................................. 27
    - 4.2.2.2- Modulus Models ............................................ 31
- 4.2.3- Girder Maturity Measurements .................................. 35
- 4.3- Girder Camber .......................................................... 36
  - 4.3.1- Calculation Models and Results ............................. 37
  - 4.3.2- Comparison Between Calculated and Actual Camber ...... 38

**Chapter 5- Conclusions and Recommendations**........................ 41

- 5.1- Using Maturity to Eliminate Differential Camber .............. 41
- 5.2- Advantages of Using Maturity in a Precast Environment ......... 41
- 5.3- Disadvantages of the Maturity Method ............................ 42
- 5.4- Additional Study Required ......................................... 42
  - 5.4.1- Affect of Curing Cycle Variation ............................. 42
  - 5.4.2- Sensitivity of Mix Variation .................................. 42
  - 5.4.3- Crossover Affect ............................................... 42
  - 5.4.4- Long-term Camber Affects .................................... 43

**References** ........................................................................ 44

**Appendix A** ....................................................................... 46

**Appendix B** ....................................................................... 80