

# **Shrinkage and Creep of Concrete 2005**

**Symposium at the 2005 ACI Spring Convention  
ACI Special Publications Series SP-227**

**New York, New York  
17-20 April 2005**

**ISBN: 978-1-60560-951-5**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571  
[www.proceedings.com](http://www.proceedings.com)

**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2005) by ACI  
All rights reserved.

Printed by Curran Associates, Inc. (2009)

For permission requests, please contact ACI  
at the address below.

ACI  
38800 Country Club Drive  
Farmington Hills, MI 48333 USA

Phone: (248) 848-3700  
Fax: (248) 848-3701

BKStore@concrete.org

# TABLE OF CONTENTS

<b>Managing Deflection, Shortening and Cracking Arising from Restrained Contraction</b> .....	1
<i>S. J. Alexander</i>	
<b>AS3600 Creep and Shrinkage Models for Normal and High Strength Concrete</b> .....	21
<i>R. I. Gilbert</i>	
<b>Sensitivity of the Models for Predicting Shrinkage of Concrete</b> .....	41
<i>A. Al-Manaseer, S. Ristanovic</i>	
<b>Deviations from the Principle of Superposition and their Consequences on Structural Behavior</b> .....	66
<i>S. Staquet, B. Espion</i>	
<b>Design Implications of Creep and Shrinkage in Integral Abutment Bridges</b> .....	83
<i>M. Arockiasamy, M. Sivakumar</i>	
<b>A Rational Approach to the Analysis of Structural Effects due to Creep</b> .....	105
<i>M. A. Chiorino</i>	
<b>Shrinkage and Creep Predictions Evaluated using 10-Year Monitoring of the North Halawa Valley Viaduct</b> .....	140
<i>I. N. Robertson, X. Li</i>	
<b>Tension Cracking in Columns Under Compression Loads</b> .....	159
<i>D. J. Carreira</i>	
<b>Estimating Time-Dependent Deformations of Prestressed Elements: Accuracy and Variability</b> .....	191
<i>M. W. Paulsen, S. D. B. Alexander, D. M. Rogowsky</i>	
<b>Shrinkage of Virginia Transportation Concrete Mixtures</b> .....	213
<i>D. W. Mokarem, R. E. Weyers, M. M. Sprinkel</i>	
<b>Design Aids for the Evaluation of Creep Induced Structural Effects</b> .....	234
<i>M. Sassone, M. A. Chiorino</i>	
<b>Effect of Modulus of Elasticity on Creep Prediction of High Strength Concrete Containing Pozzolans</b> .....	255
<i>N. Suksawang, H. H. Nassif</i>	
<b>Shrinkage Behavior and Residual Stress Development in Mortar Containing Shrinkage Reducing Admixtures (SRAs)</b> .....	279
<i>B. Pease, H. Shah, J. Weiss</i>	
<b>Performance of Self-Consolidating Concrete Under Restrained Shrinkage</b> .....	297
<i>H. T. See, E. K. Attiogbe</i>	
<b>Long-Term Creep and Shrinkage in High-Strength Lightweight Concrete</b> .....	310
<i>M. Lopez, L. Kahn, K. Kurtis, B. Buchberg</i>	
<b>Stress Relaxation of Concrete Under Autogenous Early-Age Restrained Shrinkage</b> .....	330
<i>M. Pigeon, B. Bissonnette, J. Marchand, D. Boily, L. Barcelo</i>	
<b>Modeling Early Age Tensile Creep and Shrinkage of Concrete</b> .....	342
<i>M. D. D'Ambrosia, D. A. Lange</i>	
<b>Evaluation of Thermal Warping in Pavements</b> .....	360
<i>M. A. Miltenberger, E. K. Attiogbe, A. R. Stoddard</i>	
<b>Author Index</b>	