Structures Congress 2017

Business, Professional Practice, Education, Research, and Disaster Management



Selected Papers from the Structures Congress 2017 Denver, Colorado April 6–8, 2017



EDITED BY J. G. (Greg) Soules, P.E., S.E., P.Eng

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STRUCTURAL ENGINEERING INSTITUTE

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Business, Professional Practice, Education, Research, and Disaster Management

SELECTED PAPERS FROM THE STRUCTURES CONGRESS 2017

April 6–8, 2017 Denver, Colorado

SPONSORED BY The Structural Engineering Institute (SEI) of the American Society of Civil Engineers

EDITED BY J. G. (Greg) Soules, P.E., S.E., P.Eng





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Preface

The Structures Congress has a robust technical program focusing on topics important to Structural Engineers.

The papers in the proceeding are organized in 4 volumes

Volume 1 includes papers on Blast and Impact Loading and Response of Structures Volume 2 includes papers on Bridges and Transportation Structures Volume 3 includes papers on Buildings and Nonbuilding and Special Structures Volume 4 includes papers on Other Structural Engineering Topics including; Business and Professional Practice, Natural Disasters, Nonstructural Systems and Components, Education, Research, and Forensics

Acknowledgments

Preparation for the Structures Congress required significant time and effort from the members of the National Technical Program Committee, the Local Planning Committee. Much of the success of the conference reflects the dedication and hard work by these volunteers.

We would like to thank GEICO and Pearl for Sponsoring the Congress proceedings and supporting the Structures Congress in such a generous way.



The Joint Program Committee would like to acknowledge the critical support of the sponsors, exhibitors, presenters, and moderators who contributed to the success of the conference through their participation.

On behalf of our dedicated volunteers and staff, we would like to thank you for spending your valuable time attending the Structures Congress. It is our hope that you and your colleagues will benefit greatly from the information provided, learn things you can implement and make professional connections that last for years.

Sincerely,

J. Greg Soules, P.E., S.E., P.Eng, SECB, F.SEI, F.ASCE

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A Case Study of Logan International Airport's Terminal C to E Connector: Structural Challenges and Risks for Existing Building Projects

Ryan Couto, P.E., LEED AP $BD+C^1$; and Deidre Ericson, EIT, LEED AP $BD+C^2$

¹WSP | Parsons Brinckerhoff, 75 Arlington St., 9th Floor, Boston, MA 02116. E-mail: couto@pbworld.com

²WSP | Parsons Brinckerhoff, 75 Arlington St., 9th Floor, Boston, MA 02116. E-mail: ericsond@pbworld.com

Abstract

This paper explores some of the key challenges and risks faced by structural engineers when working with existing building structures as well as identifies potential cost- and schedule-saving approaches that can streamline the design process and maintain the integrity of the anticipated scope and project quality. Often times, structural engineers enter into the design phase with incomplete existing documentation and limited access to carry out the full-scale site investigations needed to observe and record the existing structural conditions. Utilizing a case study of the recently completed \$54 million Logan International Airport Terminal C to E (C2E) Connector project, this paper explores various approaches that structural engineers can use during the design phase to expedite the building systems coordination through the use of building information modeling (BIM) tools, laser scanning, and selective localized demolition. These approaches can help minimize unforeseen conditions when the construction begins, thus ultimately helping to mitigate costly change orders and schedule delays that would be required to accommodate these unknown conditions. Successful completion of the C2E project required in-depth understanding of the original construction, subsequent renovations of both terminals (C and E), coordination between adjacent concurrent construction projects, and collaborative construction sequencing to ensure minimal disruptions to airport operations, while maintaining containment of post-security areas. Additionally, early engagement and integrated project team collaboration with the Contractor can serve to identify critical enabling packages and project milestones. This facilitates efficient and timely completion of the structural design and the complex phasing required to satisfy operation of a fully active project site open to the public and coordination with overlapping scope of adjacent projects. Throughout this paper, a number of projectspecific items are explored to further support the impact of the above-described design approaches and efforts as a way to minimize the challenges and risks faced by structural engineers when working with existing building structures.

1 INTRODUCTION

Massachusetts Port Authority, as the Owner and Operator of Boston's Logan International Airport, has a long-term plan of post-security connectivity across all terminals. The Terminal C2E Connector project served to realize a key portion of this