

**Zeitschrift:** IABSE reports = Rapports AIPC = IVBH Berichte  
**Band:** 83 (1999)

**Artikel:** Development of a new substructure system for standard bridges  
**Autor:** Billington, Sarah / Breen, John  
**DOI:** <https://doi.org/10.5169/seals-62843>

### **Nutzungsbedingungen**

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

### **Terms of use**

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

**Download PDF:** 01.04.2026

**ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>**



## **Development of a New Substructure System for Standard Bridges**

**Sarah BILLINGTON**

Assistant Professor  
Cornell University  
Ithaca, NY, USA

Sarah Billington received her Ph.D. in Civil Engineering in 1997 from The University of Texas at Austin and is a member of the Faculty of Civil and Environmental Engineering at Cornell University

**John BREEN**

Professor  
The Univ. of Texas at Austin  
Austin, TX, USA

John Breen received his Ph.D. in Civil Engineering from the University of Texas at Austin. He currently holds the Nasser I. Al-Rashid Chair in Civil Engineering at the University of Texas in Austin.

### **Abstract**

Recognising that the performance of standard short- and moderate-span bridges can be greatly improved with more thoughtful substructure design, an efficient and attractive substructure system has been developed for use with standard bridge superstructure systems. The proposed substructure system of match-cast segmental elements post-tensioned together on site combines prestressing steel with high performance concrete for improved durability and structural efficiency. An economically competitive solution is achieved through attention to fabrication and erection details, which facilitate standardisation and rapid on-site construction.

This paper focuses on the development of a precast substructure system for standard bridges focusing on element shapes, substructure configurations and the construction and erection options. The process of choosing the final system and its details is presented through a review of decisions regarding aesthetic appearance, efficient use of materials and economical construction practice. Particular attention is given to decisions pertinent to potential standardisation of the system with a focus on introducing a creative, economical option.

The process of developing this system is presented to emphasise ways in which creativity can be introduced into standard short- and moderate-span bridge design - a branch of structural design that has stagnated with unattractive results in many parts of the world.

Leere Seite  
Blank page  
Page vide