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DIFFICULT ROOTS AND HAPPY ENDS – HOW TO MASTER THE DESIGN PROCESS

Boris P. REYHER

Associate
schlaich bergemann partner
Berlin, Germany

b.reyher@sbp.de

Summary

This paper tells the story of two footbridges recently designed by schlaich bergemann partner that both started out from unusual roots and both came to convincing final results which stand in the tradition of the practice. The paper discusses what factors influence or condition good design results and also how even under unusual initial settings, the design process may be brought to a convincing final result. The discussion focusses on the process of identifying the most adequate structural concept and the subsequent process of detailing.

Keywords: structural concepts; design process; boundary conditions; *Baukultur*; bridge aesthetics; structural detailing

1. Introduction

1.1 Motivation

Footbridges are civil structures that generally are subject to the same functional and economic restraints and conditions as their larger brethren road and railway bridges. However, due to the smaller scale, shorter spans and lesser loads, the structural challenges are often less severe and there often is some room for a more playful approach to the engineering and the visual design.

However, this room, which is objectively or subjectively discovered, should not give rise to inappropriate solutions. Footbridges are still engineering structures and structural logic should be the primary driver of the design process.

Every engineer and architect knows from experience how complex, limiting and often conflicting the initial conditions of a design task can be. Still, these conditions form the starting point of the design and the process of complying with, the weighting of and the compromising between conflicting requirements is the essential nature of the design process.

In this paper, the points made above are discussed in the context of two footbridges recently designed by schlaich bergemann partner. The aspects of a thoughtful analysis of preset requirements leading to a convincing overall design are exemplified in depth in the story of *Weinberg Bridge* in Rathenow.

2. Discussion

The design processes of the two bridges presented in this paper have an interesting story in common – they both started out with unusual initial conditions. In the case of “Slinky springs to fame”, the design roots were laid out in an artist’s concept for a sculpture across a waterway.

In case of the Weinberg footbridge in Rathenow, the client had acquired a competition design from engineering students, which defined the alignment and structural typology, which was given to the engineers as part of the design brief.

In both cases however, the design story ends happily in convincing final form and detail.



Fig. 1. a) “Slinky springs to fame” bridge sculpture, Oberhausen, Germany, © Roman Mensing, b) Weinberg bridge, Rathenow, Germany, © Stephan Falk / baubild.

2.1 Conclusion

The individual approach and eventually style of structural design lies in the conscious analysis and synthesis of the design task. After choosing the ‘right’, i.e. most suitable structural solutions comes the process of detailing out structural and visual elements. This is another important contribution to the overall solution, but the essence of the engineering accomplishment is to identify and define the right structure.

Even if, as in the case of “Slinky springs to fame” in Oberhausen or the *Weinberg* Bridge in Rathenow, the client has already committed to essential form or structural systems, the structural engineering process should include careful analysis and identification of the most suitable concepts and lead into the consequent development of a complete solution. Then, an overall convincing design with holistic qualities can be achieved through a thoughtful and conscious process, even though the initial conditions were somewhat limited.

It is this conscious process that ultimately distinguishes excellent design from the merely feasible or from the direct and inconsiderate translation of formal design ideas into a structural solution. The consequent practice of this principle leads to an individual design language, which is the language of structural reason and implicitly convincing results. For young engineers looking to form their design skills, the key may lie in practicing this analytical process and in making conscious and logical design decisions.

2.2 References

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