

Book review

Sprayed Concrete Lined Tunnels

Alun Thomas. Taylor & Francis, 2008, ISBN 978-0-415-36864-3, £65, 241 pp.

Alun Thomas has produced a timely book to assist practitioners working with sprayed concrete in tunnels, as well as those studying the subject as part of their higher education. Books on these two subjects are few and far between, and anyone intent on learning or re-acquainting themselves will be glad of a simply written text that covers all the main ground (sorry, I couldn't resist it). The author brings a nice balance of rigorous academic thinking and pragmatism borne from his personal experiences. The former arises from his doctoral research and the latter from his consultancy work with Mott MacDonald Ltd on a variety of UK projects, including the Jubilee Line, the Heathrow Express and Terminal 5 at Heathrow.

The introductory chapter neatly explains what is meant by a sprayed concrete lined (SCL) tunnel and provides a brief history before moving swiftly on to a round-up of material properties in Chapter 2; this then develops in more detail the behaviour of sprayed concrete as a lining in terms of strength, stress-strain relationships, creep and shrinkage, and a little on durability. Concisely written, it gets across the key information and, as with the rest of the book, provides ample references and helpful illustrations. Chapter 3 gives a very good description of the relevant construction methods, helpfully categorised into soft, blocky and hard ground (with a nice cheese analogy which exemplifies the author's desire to help get his messages across). It concludes with a section on sprayed concrete construction which, perhaps a little belatedly, explains the crucial differences between the wet and dry methods.

The heart of the book, which appears rooted in the

author's personal experiences, is in the form of chapters on design approaches and modelling. He is, I believe quite rightly, an exponent of applying a combination of the analytical and empirical, summarised by Everton's explanation of the observational method. He explains clearly the use of sprayed concrete as a primary lining, before moving on to its functional incorporation in the final lining – both with subsequent secondary applications and with a more common cast lining. The following chapter deals with elastic and plastic models and, most importantly, extensive sections on creep and aging plus practical advice on the consideration of construction sequence. Chapter 6, on detailed design, covers ground types, shafts, junctions and a helpful range of special circumstances. Some readers might have liked more explanation of the intricacies (and pitfalls) of specification and detailing here, and the final chapter on construction management is equally concise on testing for compliance. But I am being picky because it is hard to cover all the ground to every reader's interests, and there are other sources that can provide greater detail. This book is unashamedly a primer on its subject – and a good one too, which should prove a valuable source of reference. With the coming of Crossrail and the huge shortage of skilled labour, there is an urgent need for such an introduction to this important civil engineering specialism. Every engineer involved in SCL should have access to a copy and use it to help themselves and also, critically, to provide the essential understanding to the operatives upon whom the success of the method is so dependent.

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