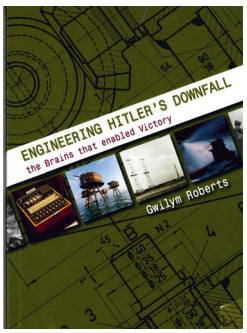
Review

Allan Mann enjoys this account of the scientific and engineering advances of Word War II, despite the field of structural engineering perhaps not being given the attention it deserves.

Engineering Hitler's downfall: the brains that enabled victory



Author: Gwilym Roberts
Publisher: Whittles Publishing
Price: £18.99
ISBN: 978-184995-386-3

There is no shortage of books on World War II. Indeed, it seems amazing that an event lasting just six years could still generate interpretation 75 years later. On the other hand, the war was a conflict so tumultuous, and a cause of so much social change, that continuing curiosity is easily explained. For our own profession, war-time demands stimulated enormous changes laying the foundations for engineering products and knowledge we use today.

The author of this book is a past-president of the Institution of Civil Engineers and its drafting seems to have been his labour of love. Most books on the war deal with strategy, campaigns and bravery: all essential. Nevertheless, in modern warfare no navy can sail without docks; no air force can function without airfields or service facilities; and no army can progress without infrastructure supporting movement. Above all, no war can be waged without massive production facilities and victory may well go to those who produce the most and replace their losses fastest.

Mr Roberts has set out to record the incredible contribution engineers of all disciplines made to the war effort, cataloguing their inventions and portraying key personalities, all against the background of unfolding events. Most of these will be well known, from the Battle of Britain to the bombing of Hiroshima. Many of the engineering inventions will also be known: the iconic Spitfire, radar, bouncing bombs and V2 rockets. Less well known will be a myriad of other inventions: weapons, navigation and detection systems, and so on.

"PERHAPS THE PRE-EMINENT STRUCTURAL ENGINEERING CONTRIBUTIONS WERE TEMPORARY BRIDGING AND THE MULBERRY HARBOURS"

Perhaps our own discipline of structural engineering is under-represented or maybe hidden within short descriptions. The Merlin engine gets its just headlines, but the (structural) evolution of air frames supporting the engine is scarcely mentioned. Think that at the beginning of World War I, it was just about possible to fly. Yet a mere 25 years later, the Allies were flying massive four-engined bombers.

Moreover, those planes were so heavy that getting them airborne off a grassy field was no longer feasible and required proper airstrips. Think of the construction demands of laying so many strips at record rates. In the Pacific, production demands were so intense that they spawned the evolution of much of today's commonplace heavy civil engineering equipment.

Concrete is not highlighted: I suppose it's hard to compete with the 'glamour' of radar and the cavity magnetron. Yet civil engineering did make a huge contribution. The Germans' Atlantic Wall (17M cubic metres of concrete) is only recorded in an appendix. Concrete protection, in the form of pill boxes, tank traps and air-raid shelters, is described, as are concrete roof protections to the German rocket launch sites, but there was clearly no space to go into technical detail.

Perhaps the pre-eminent structural engineering contributions were temporary bridging and the Mulberry harbours, and space is devoted to them both. Institution Past-President Sir Alan Harris gets a good mention, along with his post-war interests in prestressing. What is not mentioned is that the 'secret' of prestressing was brought to Britain before the war by an Austrian Jewish refugee (Walter Mautner) and used to good domestic effect during the war.

It's possible to quibble with some historical views that are popularly accepted as fact. The foreword by Admiral Lord West gently points out that the Battle of Britain did not actually prevent a German invasion: other circumstances made that highly improbable. Likewise, reading the book gives an impression that Russian contributions were perhaps incidental. The Russians would not see it that way.

Page 1 includes an assertion (from Max Hastings) that *'Churchill's nation far surpassed Germany in the application of science and technology'*. Many would argue that is an exaggeration. Mr Roberts' book rightly lauds the scientific and engineering skills deployed in cracking the German Enigma machines. But such effort would never have been required had it not developed its machines in the first place. Ultimately, whose technical community was the more ingenious is a fruitless debate.

This book concentrates on developments made by UK engineers and, as such, it is a tale well worth telling and the characters involved are well worth reading about.

Allan Mann
BSc(Eng), PhD, FREng, FIStructE

Allan has been an active member of the Institution for most of his 'engineering' life. He was awarded the Gold Medal in 2011. To mark the 70th Anniversary of VE Day in 2015, he published 'Engineering victory: structural advances during World Wars I and II' (*The Structural Engineer*, 93 (5), pp 10–17).