

Foreword by Tony Abbey FRAeS

This is the second book by Dominique Madier. I came across his first title, *Practical Finite Element Analysis for Mechanical Engineers*, back in 2020. I was immediately impressed by the quality and freshness of this earlier work. It provides the technical foundation necessary to understand and apply FEA techniques in a clear and enjoyable way. It has become evident that many engineers have really benefited from owning a copy of this book.

The new book, *Harness the Power of Finite Element Analysis*, develops this theme further and becomes a guide for team building and managerial aspects within this discipline. This is very timely, given the continuing growth of FEA. New teams are being formed and new consultancies are being created daily. However, from my own observations, it is vital that discipline and accountability form part of that endeavor. Dominique underlines that aspect throughout the book. Hence, each of these enterprises would be very well served by purchasing a copy of this work.

This second book contains many strategies to help build and manage teams in the most effective manner. They are well thought out and, in my opinion, merit implementation. The reader can leverage Dominique's extensive experience to craft tailored development plans for their FEA teams.

Despite a strong emphasis on developing an enterprise-wide culture, it struck me how much valuable insight the book will provide the individual consultant. The structured approach it outlines applies equally well to both teams and individuals.

The first section of the book introduces FEA, explaining the basic principles, the common applications across industries, and why the technique is so relevant in today's world. For aspiring team managers without a technical background, this is ideal. But for those wanting to get involved at the sharp end, it will provide an excellent segue to his previous book.

The next section dives straight into building and managing an effective FEA team. Topics such as the team structure, skills and qualifications required, and how to manage FEA projects are all covered. I like Dominique's approach here. He

emphasizes that carrying out analyses accurately and efficiently requires a lot of skill and that there are no shortcuts.

Following on from that theme, the next section looks more closely at how to ensure accuracy and quality in FEA, providing essential roadmaps and practices for professionals at any level. This material is essential reading for anyone wanting to engage in this area. Dominique covers the many pitfalls, such as numerical inaccuracy or wrongly defined boundary conditions. I would be very tempted to make reading this book a mandatory requirement for any consultant I was hiring!

The section on tools and resources adds very useful insights into the complex world of high-performance computing systems, cloud computing, and open-source tools. By analyzing case studies of successful implementations, he demystifies the often-complex trade-offs between scalability, cost, and computational power. FEA is a resource-intensive process, so guidance in this area is very welcome.

Dominique provides important guidelines for developing the necessary professional skills to be an FEA analyst. In my own experience, you never stop learning. I believe that a thirst for knowledge is essential, and he shows how this can be fostered with mentoring and continuous learning.

Dominique rounds off the book with a series of further case studies and real-world applications, where he shows his philosophies being put into action.

In summary, I have no hesitation in thoroughly recommending this book. For anyone tasked with developing or taking over the management of an FEA team, this is going to be a very wise investment. Equally, for a consultant who has decided to go it alone, the book will be an ideal companion. To emphasize my earlier point, I would make it a requirement for a subcontractor to demonstrate knowledge of the contents within!

Tony Abbey

Tennessee, November 2024

About Tony Abbey FRAeS

Tony Abbey is a highly respected professional in the field of Finite Element Analysis (FEA) and engineering simulation. With a career spanning over 40 years, he has established himself as an expert in Dynamics, Composites, Fatigue and Fracture Mechanics, Optimization, Nonlinear, Thermal Analysis, and many other areas of FEA. Tony has been a key player in the aerospace industry, collaborating closely with clients, and has made significant contributions to software development by developing the user interface for multiple CAD-embedded FEA projects.

His expertise encompasses both the practical application of FEA for solving complex engineering problems and the education of students on various platforms. Tony has authored numerous technical articles, papers, and training materials aimed at demystifying the complexities of FEA for a broader audience. He is well known for his engaging teaching style, which makes sophisticated engineering concepts accessible to students of varying levels of experience. Since 2007, his consultancy, FETraining, has developed and delivered over 200 online e-learning classes. Nearly 6,000 attendees have benefited from his experience during that time.

In addition to his contributions to industry and education, Tony has been actively involved in professional societies like the Royal Aeronautical Society, where his contributions to the field of aeronautics and astronautics have been recognized with the prestigious Fellow of the Royal Aeronautical Society (FRAeS) designation. This title is awarded to individuals who have demonstrated significant achievements in the aerospace industry.

Tony's commitment to the advancement of engineering simulation and analysis has made him a sought-after consultant, educator, and speaker at conferences and workshops worldwide. His work continues to influence the evolution of FEA and engineering simulation practices, making him a notable figure among professionals and academics in mechanical engineering and related fields.