Introduction to Superalloys and their Applications

Further Reading Suggestions

The book chapter by Mouritz provides a quick introductory overview of superalloys, including the iron, cobalt and nickel base types, and doesn't go into too much detail on each topic. For more information, the online educational resource page by Harry Bhadeshia gives some very succinct summaries of more complex Ni superalloy topics, including the chemical trends of the different alloys. Follow the links on the webpage to learn more about each topic. Harry Bhadeshia is a big name in research on steels and also has some key research papers on superalloys. Finally, the book by Roger Reed has helped develop this part of the lecture course and is a very useful resource. A read of the Chapter 1 Introduction will clarify some of the introductory topics we have covered so far. Then, Chapter 2 on the physical metallurgy of nickel and it's alloys will help you with the phase precipitation mechanism and strengthening effects, which will be covered in Alec's lectures on precipitation in Ni superalloys. After this, we will return to cover Chapters 3 and 4 on the processing of superalloys for turbine disks, and single-crystal superalloys for turbine blade applications, as well as briefly covering the importance of new coating technologies for Ni superalloys.

- Book Chapter – Adrian P. Mouritz, Chapter 12 - Superalloys for gas turbine engines, in Introduction to Aerospace Materials, Woodhead Publishing, 2012, 251-267, https://doi.org/10.1533/9780857095152.251

- Online Document – H.K.D.H. Bhadeshia, Nickel Based Superalloys, 2021, http://www.phase-trans.msm.cam.ac.uk/2003/Superalloys/superalloys.html

- Book *(pdf copy available online)* – Roger C. Reed, The Superalloys: Fundamentals and Applications, Cambridge University Press, 2008.