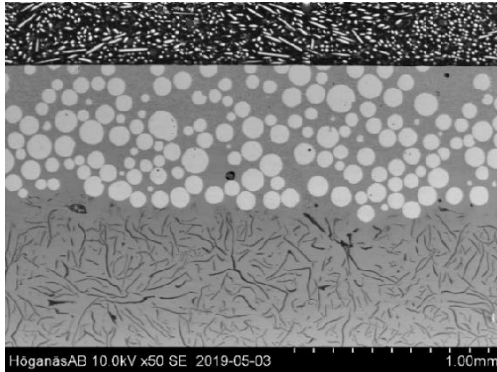


Course syllabus for

Hard facing technology for wear resistance

Syllabus adopted 2021-04-15 by Prof. Bengt-Göran Rosén, Produktion2030 Head of Education



Dizdar et al., Atmosphere **2020**, 11, 621; doi:10.3390/atmos11060621

Credits	5 hp
Grading scale	Satisfactory/not satisfactory
Education cycle	Third-cycle
Examiner	Senad Dizdar, Dr. Habil. (Docent) in Tribology Halmstad University
Eligibility	Post graduate study in production / mechanical engineering or equivalent
Aim	The course aims to provide a basic understanding of hard facing technology in a hard faced component life cycle, from order, design, manufacture, deposition, tribo-performance assessment, service life and end of life (refurbishing/recycling/discarding). Attention is payed on a transparent communication between all participants in the cycle based on EN 14700. Last, but not least, sustainability aspects are highlighted in every part of the cycle.
Intended learning outcomes	After completion of the course the course participant should be able to: • reflect over hard facing technologies for wear resistance, • select a hard facing technology to meet demands of a target tribological application, • transparently discuss hard facing technology.

Course content	The course covers the whole hard faced component life cycle, from order demands, design for hard facing, thermal spray technologies (e.g. flame -, plasma-, arc-, detonation-, high velocity- and cold spray), overlay welding technologies (e.g. PTA welding and laser cladding), communication by using EN 14700, critical comparison of hard face technologies and selection of a suitable hard face technology for a target application.
Course organisation	The course includes lectures and laboratory workshops for three days. The participants can bring their own samples of interest as discussion objects, but this is compulsory. The course sponsors are kindly supporting with demonstration of hard facing technologies as well with hard facing of the test samples.
Examination	A successful completion of this course is to be evaluated based on the following: • seminar based on the participants' hard facing understanding and brief reports from group works, • written report based on selection of hard face application on own or another suitable sample.
Literature	• P. L. Fauchais, J. V.R. Heberlein, M.I. Boulos, Thermal Spray Fundamentals - From Powder to Part, Springer Science + Business Media, New York, 2014, https://doi.org/10.1007/978-0-387-68991-3. • A- Gebert, M. Kai,. F.W. Bach, A. Laarmann, T. Wenz (2004). Oberflächenschutz durch Auftragschweißen. In Moderne Beschichtungsverfahren (pp. 287-322). Wiley - VCH Verlag GmbH & Co. KGaA. https://doi.org/10.1002/3527604278.ch18 • L.-M. Berger, 1.17 - Coatings by Thermal Spray, in Reference Module in Materials Science and Materials Engineering, Comprehensive Hard Materials, 1 (2014) 471-506, https://doi.org/10.1016/B978-0-08-096527-7.00017-9 • S. Nowotny, L.-M. Berger, J. Spatzier, Ch. 1.18 - Coatings by Laser Cladding, in Reference Module in Materials Science and Materials Engineering, Comprehensive Hard Materials, 1 (2014),507-525, https://doi.org/10.1016/B978-0-08-096527-7.00018-0 • Printed and digital material distributed and referenced to during the course.