Structuring and preparation of a lesson: **EAS module 9 (Manufacturing case studies)**

time	Theme, core information, statements or questions	Learning objectives [1]	Methods (e.g. presentation/ discussion/group work)	Media/ training material
4 h	<u>Case studies:</u> Presentation of a industrial application of an adhesively bonded joint with a focus on the procedure of selecting an appropriate adhesive and related surface treatment Presentation of a failure case with focus on the procedure of selecting appropriate methods to find the reason(s) of failure Presentation of appropriate/non appropriate joint designs Presentation of a quality management concept for an adhesive bonding process Note: It is also possible to cover more than one all above mentioned topic in one single case study	To be able to act in an interdisciplinary way to create solutions for a given task (e.g. selection of an adhesive for a given application or to generate a quality management concept for a given bonding process) (3) To be able to assess in a basic way a given joint design and give recommendations for improvements (3) To be able to analyse a failure case in a basic way by and give recommendations for improvement (3)	Presentations Discussions Assay by the participant	Demonstration objects (e.g. bonded parts/products) Video White board Presentations
4 h	<u>Group exercises:</u> Selection of adhesives and related surface treatment for a given application Selection of analytical methods for failure	To be able to act in an interdisciplinary way to create solutions for a given task (e.g. selection of an adhesive for a given application or to generate	Group works	Slides White board Text book

[1] (1) Know and understand, (2) transfer and practically apply, (3) analyze and assess; (0) no learning objective; additional information

	analysis Joint design and possibilities for improvement Quality management concept for an adhesive bonding process	a quality management concept for a given bonding process) (3) To be able to assess in a basic way a given joint design and give recommendations for improvements (3) To be able to analyse a failure case in a basic way by and give recommendations for improvement (3)		

Alternative approach: PROJECT

At the ANB discretion, it is possible to accept a project based on the candidates' real work with its reporting to all other course attendees instead of lectures about case studies.

The project shall be in form of a case study designed for performance within a special amount of hours depending on the qualification level of the candidate (allocated time). It has to be finished in an allowed time (maximum time permitted) which also corresponds to the qualification level of the candidate. Depending on the capability of the candidate the study may also be finished in a shorter time.

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This case study may be done by a team study with max. 7 participants. However the final report and the presentation shall be carried out by the examination candidates individually. Attendance of all course members is obligatory and active involvement from all attendees with technical questions at the presentation is highly recommended.

Allocated time	8 hours
Maximum time permitted	3 weeks

In the project with a wide scope of application the candidate shall be tested to the logical application of his knowledge. The project shall be carried out by the candidate independently.

The ANB takes a choice of bonded structures according to codes and/or product standards. One application from following industry sectors shall be taken:

- Automotive,
- Construction,
- Marine,
- Packaging,
- Other sector.

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The project work is detailed as following:

9.3.1 Project content	**EAS**
Understand the consequences of the desired manufacturing code.	X
Evaluation of drawings and technical specifications.	X
Read and understand drawings and technical specifications.	-
Evaluation of and comments to the choice of base materials. Discuss the adhesive properties of the materials.	X
Knowledge about the choice of appropriate adhesives. Discuss the joining possibilities of the materials. Any needs for surface treatment.	-
Evaluation of the final construction.	X
Discussion of the construction based on the choice of:	-
– Joining method(s) for the base material(s);	X
– Surface treatment methods of base material parts;	X
–Testing;	X

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– Health and safety;	X
– Environmental aspects;	X
– Durability;	X
Preparation of necessary WPSs and testing methods.	X
Evaluation of necessary joining qualification(s).	X
Plan for QA procedures to be used during and after joining.	X
Prepare:	
– Production plan;	X
– Working plan – including all bonding sequences;	X
– List of standards needed for the project;	X
– Type of workshop for this kind of production shall be discussed. Evaluation of fabrication costs.	X

9.3.2 - Final report and presentation	**EAS**
The candidate shall prepare a final written report with results from his project.	X

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The report shall include view points regarding economical production and at same time ensure the quality of the product.	X
The candidate shall give an oral presentation of the project in front of the board of examiners and other course participants.	X

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