



EMMC Translation Case Template

Introduction

Translator Profile

- What type of Translator is your institution:
 - Non profit Research Institute
- What is your field of expertise: specify type of material, type of models according to RoMM (please see [Review of Materials Modelling](#)), type of property/phenomenon, other?
 - The model was a Continuum model.
 - The flow and oxide skin behaviour in hot dip galvanizing process was simulated and optimized

Client

- Who is the client? Is the client a large company, SME or a consortium thereof?
 - The client is a SME
- Which value chain segment (e.g. material producer, convertor, end-user) it is positioned?
 - Convertor
- Did you have existing collaboration with the client?
 - No

Industrial/Business Case

- Describe briefly the industrial problem.
 - The problem was that oxide skins form on the surface of a hot dip galvanizing bath. A special technology was developed to remove the oxide skin. However, the process was challenging and not very efficient in some cases. Inclusions were formed and would attach to the newly galvanized surfaces. It was a need to understand the source of the surface defects on galvanized goods as well as the efficiency of the applied surface oxide removing flow device.
 - The SME was delivering the furnace to clients and the work was related to technology transfer to support the delivery of the furnaces
- Indicate involved budget or preferred time to solution (duration).
 - The budget corresponded to two full work weeks, time to completion was 4 weeks.
- Indicate what was the expected outcome of the translation process.
 - The work should end with concrete recommendations to improve the process.

Translation to modelling solution

- What type of model(s) did you use propose and use? Explain arguments and criteria used to propose and choose a specific modelling approach and modelling executor for the specific industrial problem.
 - The customer of the SME was visited and the inclusion related challenges were seen in operation. This was critical in order to devise a modelling strategy.
 - By the help of computational flow modelling and process understanding the process was simulated in a 3D CFD code.



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- The domain knowledge of the executor was critical for providing a good answer to the SME.
- No process data was provide by the SME, only qualitative information. Physical properties for the fluids and solid were provided. The SME had no resources to obtain detailed experimental data from the process. Accordingly, no model validation was performed. The SME took the recommendations, based on the CFD study, as input to their further developments.
- Model accuracy was not discussed. The SME did at the time not have qualified people to take part in such discussions (at that time they had none with master degree or higher).
- Possible investments would be on the SME Client side. This was not discussed.
- One single person ran the project, but in collaboration with the QA responsible. The modelling executor was decided by the PM and QA responsible, based on combined modelling skills and domain knowledge.
- The client (SME) invited to a visit to the clients vendor. The trip was arranged by the client. The client was responsive to answer questions from us. After the report was finished a meeting with the client was arranged to discuss the results.

Client's benefits from the modelling

- How did the client use the modelling results?
 - The recommendations from the report was considered as very useful by the client. This would be useful in advising the client's clients about oxide skimming solutions.
- What were the benefits for the client of using modelling? Give a semi quantitative or qualitative estimate
 - We had no feedback from the client after the project was finished. No quantitative estimate can be given. However, the work would strengthen the knowledge that is necessary for successful sales and would be a significant advantage for the customers.

Evaluation of the translation case

- Indicate eventual bottlenecks encountered in the translation process or any suggestion for improvement of the process.
 - The main bottleneck was that the client had very limited resourced to do development. The work was done in direct contact with the CEO as he was the only with technical overview. He was also the sales manager.