Modelling of Fluid Flow and Heat Transfer at Tata Steel

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For the steel industry, modelling is an indispensable tool in process and product development. This will be illustrated by some typical examples from across the production chain, showing model development across several length and time scales. Taking industrial scale CFD and FEM approaches as the starting point, further development is in two directions. The first direction is towards simplification, allowing vast parameter studies or bringing the modelling results to the shop floor. To date, we have been using traditional approaches here, but more advanced approaches towards reduced order modelling, and combining CFD and machine learning tools come into view. The second direction is towards the fundamental side, and involves a critical assessment of modelling assumptions and simplifications that are inherent to industrial size computational efforts. Partly this is done in house, using the opportunities from continuous software and hardware development, e.g. in replacing RANS with LES. Another strain of this work is in collaboration with academic partners, involving a combination of smaller size fundamental numerical models and experimental validation.