

SUMMARY

While performing this work, we analyzed the functionality of the current flue gas neutralization system, identified some of its shortcomings, such as many additional third-party parameters for calculations, which is difficult to configure and not intuitive for operators, sometimes slow response to transit delays and its regulation mainly based on raw gases parameters before cleaning.

We collected the necessary data from the real system during various periods of its running time, and preprocessed them for analysis in Matlab. We analyzed various models and decided to build the State-Space model due to its relative simplicity for application, but sufficient complexity to reflect process dynamic behavior. We proceeded next to identify and evaluate the model. After several attempts, we started to get stable models. After receiving a good model, we started to design MPC using related add-on in Matlab. After importing the most stable model and selecting suitable parameters for MPC, we got good control characteristics.

Next, we exported the MPC to Matlab/Simulink, where we made a simulation as close as possible to real process plant control by choosing a different model for process simulation.

The transition to a real system requires more preparation and additional research. This work is a subject for future research.

In my opinion, in complex control systems, when the final result is affected by several input parameters and it is required to control several output mechanisms at once, MPC can be very suitable for such areas.