



Autor práce: Gjemajl Maliqaj

Název práce: Numerical simulation of flow in the wet scrubber for desulfurization

Typ práce: Diplomová

Vedoucí: doc. Ing. Tomáš Vít, Ph.D.

Pracoviště vedoucího: Department of Power Engineering Equipment

A. Formální náležitosti práce:

Velmi dobře

(Vyjádřete se k jazykové a typografické úrovni práce, struktuře textu, řazení kapitol, přehlednosti ilustrací a ke skladbě, správnosti a úplnosti citací literárních zdrojů)

Formal belongings of the thesis: Very good

The text is written in English with occasional occurrence of grammatical and typographical mistakes. In the whole text are missing punctuation, then there are mistakes in links to the sources (underscore before the number of citations) and images (uppercase text in the word "Figure"). The work is divided into five chapters. The division into chapters is done improperly with regard to their content. Chapter 2 presents a theory of chemistry desulphurization process and also describes CFD multiphase models, these chapters would be appropriate to divide. Quotations are carried out according to rules.

B. Řešení práce po teoretické stránce:

Velmi dobře mínus

(Vyjádřete se k rozsahu a způsobu zpracování řešerše, způsobu popsání řešeného problému, případně k vhodnosti a náročnosti použité teoretické metody)

Thesis theoretical part: Very good minus

Background research is based on of several English-language articles. Introduction aptly describes the historical development and distribution of equipment for flue gas desulphurisation (FGD). Goals described in section 1.4 does not fully enter, they do not involve chemical interactions between flue gas and droplets of lime slurry. Background research contains a comprehensive description of the problems of multiphase flow and only a superficial description of the chemical interactions in the desulfurization scrubber. The information is not sufficient for a complete implementation in the numerical model. Description of the chemical reaction kinetics is missing.

C. Praktická část práce:

Dobře

(Vyjádřete se k přiměřenosti a náročnosti použitých metod, k úrovni a množství získaných dat.)

Thesis practical part: Good

To solve the problem was chosen ANSYS Workbench environment, specifically software Fluent. Based on consultation with the supervisor were created simplified geometric model, mesh in several versions with different element sizes. Boundary conditions were defined. Further, settings of the numerical model was made for the flow of gas mixture (flue gas) including the injection of lime slurry. The task has not been fulfilled completely, because the numerical model does not include model of chemical reactions.



D. Rozbor získaných výsledků:

Dobře

(Vyjádřete se k úrovni zpracování získaných dat, včetně určení nejistot měření, k diskusi výsledků a formulování závěrů.)

Results analysis: Good

The results of the numerical model (without chemical reactions) show the velocity fields, turbulent quantities, distribution of components of a mixture of gas and distribution of the slurry in a few well-chosen cutting planes. Evaluation of the effect of element size on the results was made. Presentation of the results is confusing. The results, which are closely interrelated are located at several sides. That makes it difficult to read. Conclusions are formulated in a sufficient extent with respect to the results. Recommendations for future work are mentioned.

E. Celková úroveň a náročnost práce:

Velmi dobře

(Vyjádřete se k celkové náročnosti a rozsahu práce a k původní práci studenta.)

Level and quality of the thesis: Very good

The overall difficulty of the work is adequate to the level of the diploma thesis. In solving author demonstrated the ability to find important information in the available literature, in the subsequent solution of the problem he was not able to fully use this information. When creating a numerical model, only the basic models implemented in Fluent were used. The author applied only default settings without understanding the issues of multiphase models.

Celkové zhodnocení:

Overall evaluation:

This thesis deals with the process of FGD focusing on the numerical modeling of processes occurring in wet scrubber. The author failed fully to apply the theoretical knowledge in the development of a numerical model. He was able to work individually on partial tasks, but the complexity of the work be ensured only thanks to frequent consultations. The student was not able to individually set up some sub-models, without the intervention of a supervisor would not be able to complete a thesis. Task of work has been fulfilled only in part. Besides background research section devoted to the issue of chemical interactions between flue gas and the lime slurry missing.

Otázky k obhajobě:

Questions for the defense:

1. What is the value of Reynolds number in the solved area? Why you choose turbulence model k-epsilon for your simulation?
2. Explain how were obtained values of quantities in charts on p. 54-55?

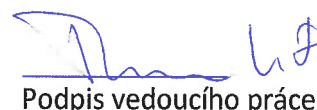
Celková kvalifikace: Práce splňuje požadavky na udělení akademického titulu, a proto ji doporučuji k obhajobě

Navrhuji tuto práci klasifikovat stupněm **Velmi dobře mínus 2-**

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Podpisem současně potvrzuji, že nejsem v žádném osobním vztahu k autorovi práce



Podpis vedoucího práce