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OPTIMIZATION OF A DEETHANIZER DISTILLATION COLUMN WITH A CHANGE IN REFLUX FEED IN THE ASPENHYSYS SOFTWARE ENVIRONMENT

Aytbaev Janibek Alibekovich
Tashkent State Technical University, Independent Researcher
E-mail: j.o.n91@inbox.ru

Abstract
A computer model of the deethanizer distillation column was developed, optimization of the deethanizer distillation column in the aspenhysys software environment.

Keywords: aspenhysys software environment, ethane, deethanizer, reflux, distillation column.

INTRODUCTION

In modern technology, the separation of natural gas, while obtaining the fractionation of ethane, the presence of which greatly complicates the calculations of distillation columns. In order to solve the problem, the Aspenhysys program was used.
The development of a control system for modern technological processes and optimal control of existing industries is impossible without the use of simulation programs that have a high accuracy in describing the parameters of technological processes and allow you to study these processes without significant material and time costs. These modeling studies are of great importance not only for the design, but also for the functioning of existing industries, since they allow taking into account the influence of external factors on the functioning of existing industries.
In the work, for the creation of computer simulation, the Aspen HYSYS program, a leader in the field of software for modeling and optimizing technological processes in the oil and gas industry, was used [1,3].
Aspen HYSYS software products for engineering calculations and simulations are the basis for designing new technological processes or upgrading existing technological processes in order to improve their performance. Aspen HYSYS software products are used to build models and make decisions based on simulation results, providing: linking design, management and business processes. Due to the open architecture of Aspen HYSYS software products, the scope of application of models created for the purpose of engineering calculations is significantly expanding[2]. These models can also be used for factory settings management, real-time optimization. All models in Aspen HYSYS software products are based on knowledge of technological processes

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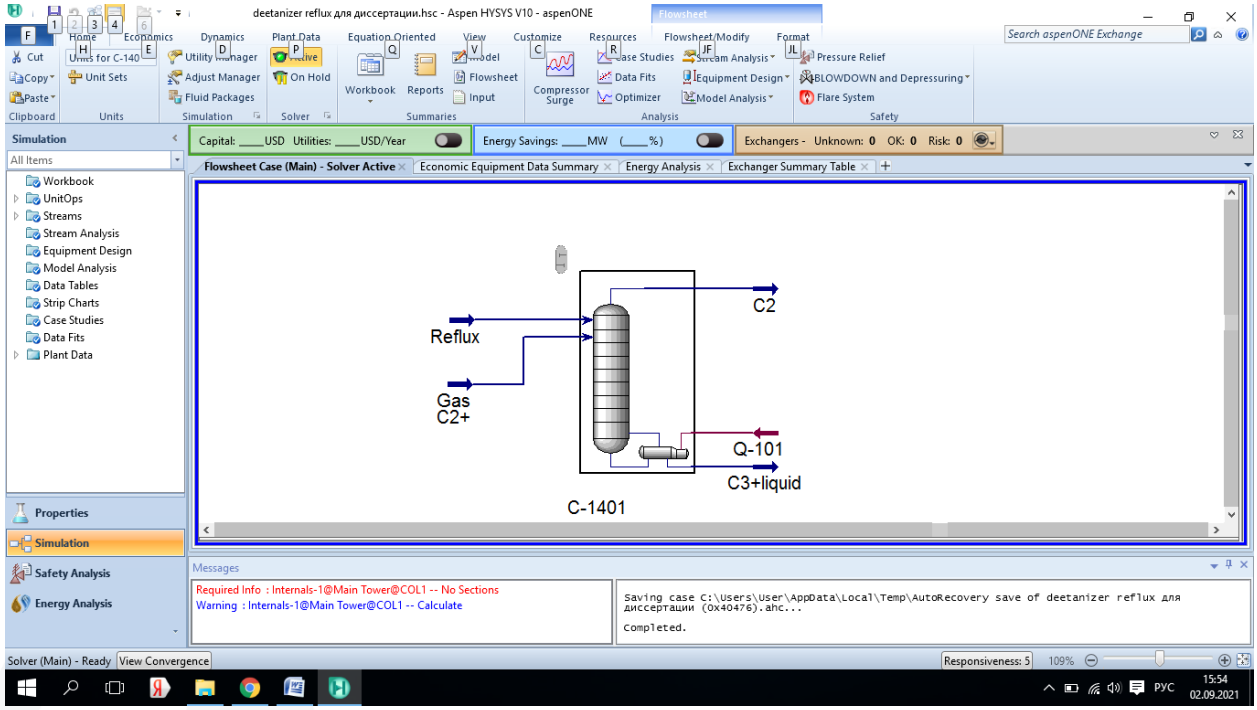
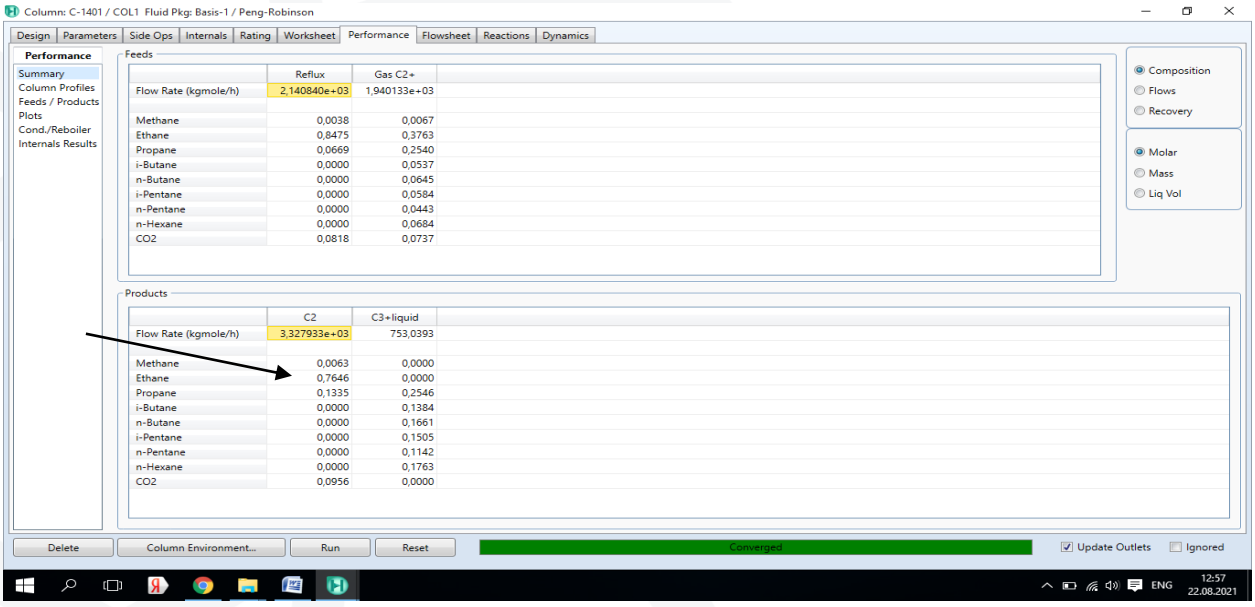
and combine all previous engineering innovations and information technology achievements, and provide reliable results, tested on real industrial installations[4].



Picture.1. Computer model of the Deethanizer

At the initial stage, a preliminary calculation of the distillation column of the deethanizer was made (Picture.1.). The target component of the dissertation work is ethane. On the calculation, the content of ethane turned out to be 0.7646 (Picture.2.).



Picture.2. Viewing calculation results

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When optimizing the distillation unit of the deethanizer with a change in the parameters of the incoming molasses reflux, we obtained the following results.
Under normal operation, the molasses mass flow rate feed irrigation (reflux) entering the distillation column is 68711 kg/h and the steam flow in the reboiler is 13214 kg/h (Table 1.).

Table 1.

Mass flow(reflux) kg/hour	Ethane content (product quality)
30000	0,5492
35000	0,5776
40000	0,6054
45000	0,6317
50000	0,6587
55000	0,6856
60000	0,7116
65000	0,7421
69000	**0,7663**
70000	0,7723
75000	0,8018
80000	0,8302
85000	0,8582
86000	**0,8632**
90000	0,8601
95000	0,8562
100000	0,8522
105000	0,8482
110000	0,8442
115000	0,8402
120000	0,8362

Here, with a change in the mass flow rate of the reflux feed of 86000 kg/h, we have reached the most optimal result of the study. The result showed that the content of ethane is 0.8622 (Picture.3,4.). The bottom figures and graphs show the results.

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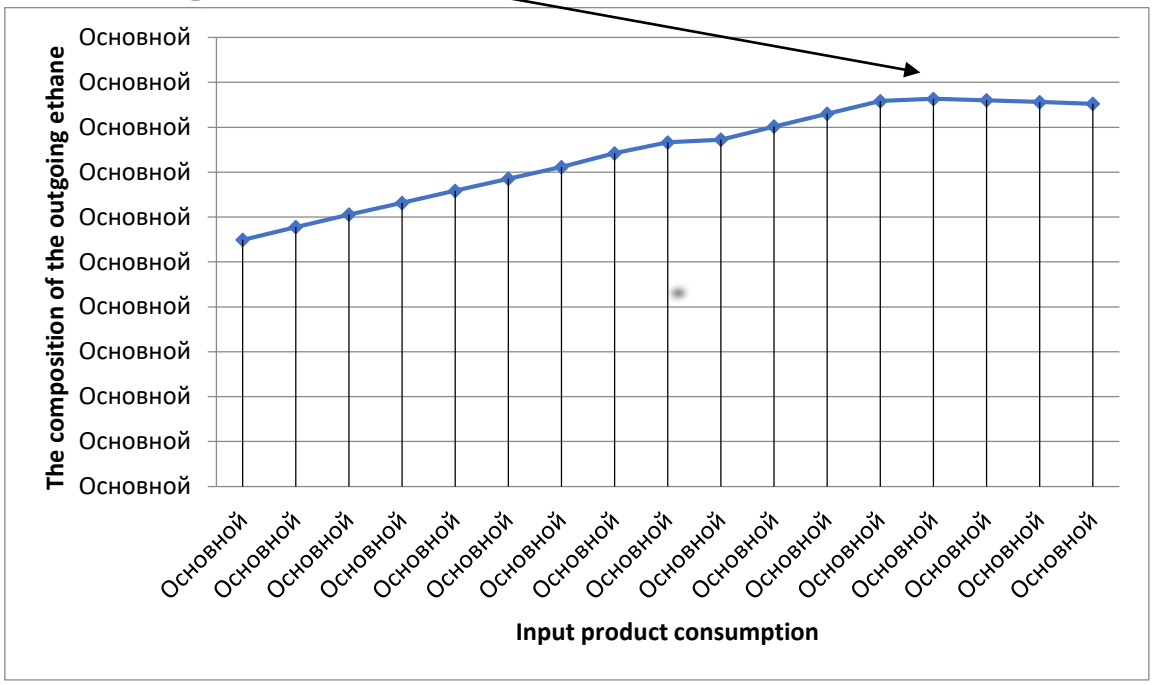
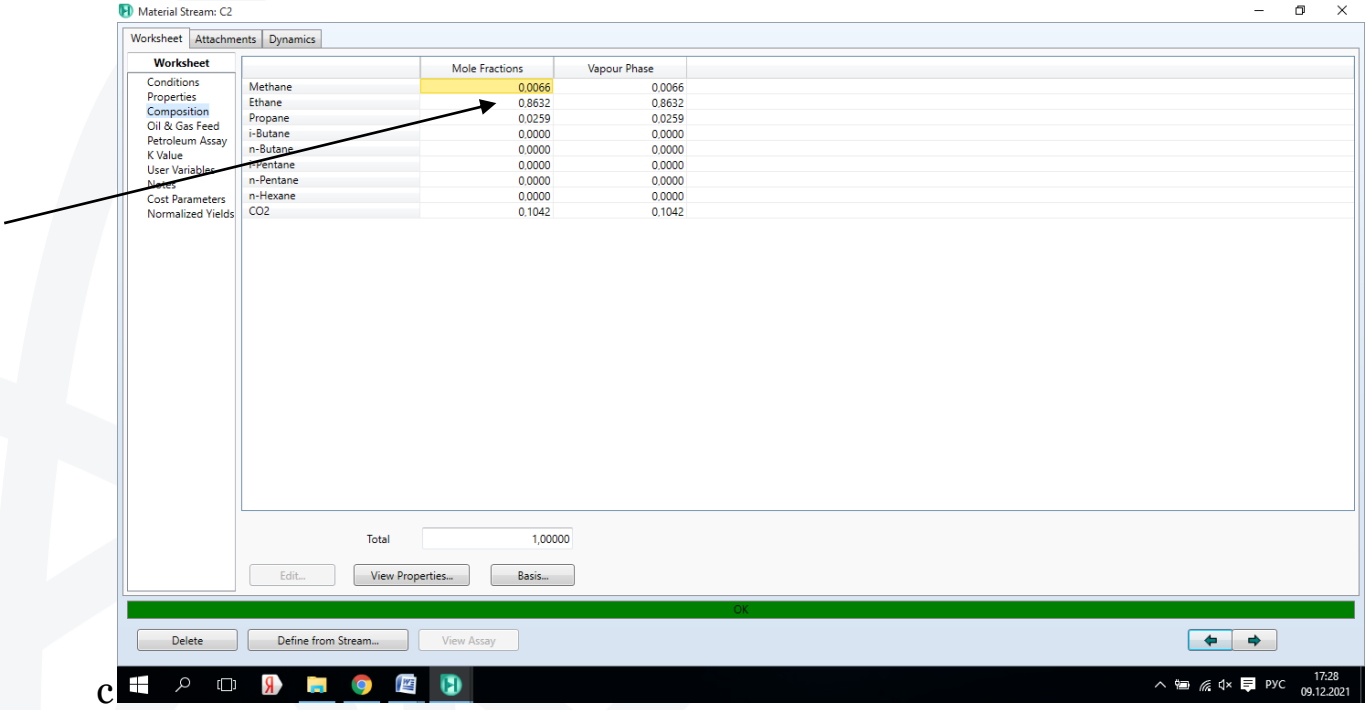


Picture.3. Calculation results



Picture.4. Viewing calculation results

With an optimal result, the molasses mass flow rate of the reflux feed is 86000 kg/h, the steam in the reboiler will be 16538 kg/h. The exiting molasses completely covers the spent steam. When optimizing the quality of the output ethane increased by 10%.

References

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