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Thus. in order to control the operation of gas lift wells. the possibility of estimating the real parameters of the multiphase flow in the riser based on the actual data of the well. taking into account the phase shift. was determined.

3. Conclusion

1. A new approach based on well operation data is proposed to determine the true characteristics of multiphase flows in gas lift (fountain) risers as well as in vertical pipes of underwater pipelines.

2. On the example of the wells of the "Gunashli" field (Submersible Platform-15) based on the actual operational data. the feasibility of estimating the real density. real gas capacity and phase shift of the gas-liquid flows in the risers and their suitability for engineering calculations have been shown.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research.

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Research on the possibility of hydrocarbon emissions control.

A.I.Babayev, N.I.Imanova, Z.A.Baghirova, T.H.Malikov

Scientific Research Institute of Geotechnological Problems of Oil, Gas and Chemistry, ASOIU, 20 Azadlig Avenue. Baku, AZ-1010 Azerbaijan

Abstract.

All processes in the chemical and petrochemical industry generally consist of a number of comparable standard processes, although the products produced may vary. In the chemical engineering industry and related industries, a typical process is a fundamental step in technology. For example, in the production of ammonia (NH_3), gasification, reforming and synthesis of NH_3

are typical processes that are interconnected and create a complete technology. Practically, the technological chain of methanol production also follows this sequence. Also the production of carbamide. The technology of individual production may consist of a large number of standard processes to obtain the desired product. However, the mechanisms for the formation of fugitive emissions in any state of aggregation practically differ little, except for the chemical composition of the emissions. As a result, the results of this study and methodology can be successfully applied to other installations and industries.
Key words: technology, processes, production, methanol, organized, unorganized emissions, ecology, thermal imaging control.
*Corresponding author. Tel.: +994 519489895
E-mail address: ziba.b84@gmail.com

1. Introduction

As technological installations know, emissions into the atmosphere are divided into 2 types: organized and unorganized. The analysis of fugitive emissions acquires particular importance after a long period of operation of the installation, after the elimination of major technological accidents, during the commissioning of new ones put into operation after major construction and fundamental technical refurbishment and reconstruction in order to avoid loss of resources and environmental pollution. Notes that the chemical industry is only a minor source of emissions for most pollutants (1-4). In this work, we will consider the possibilities of analyzing and calculating fugitive emissions in existing methanol production after long-term operation and relocation.

2. Conducting the experiment

Research was carried out at all potential sites (points) of fugitive emissions (leaks) on process pipelines, units, vessels and devices of auxiliary, main production and tank farms.

The inspection of "points" of potential leaks was carried out using thermal imaging control technologies. Experimental studies under operational conditions were carried out in accordance with the main provisions of the developed thermal imaging control technology. Before carrying out thermography, all necessary preparatory operations were completed. As a diagnostic equipment, a thermal imager of the FLIR GF320 type was used. The device is able to quickly survey large areas and detect the presence of hydrocarbon gas leaks in real time (5). Recently, intelligent thermal imaging equipment has been successfully used, which is an effective tool for monitoring any temperature changes in a variety of fields and industries, to ensure safety at production facilities in order to identify defects and prevent leaks of hazardous substances (6).

The number of examined "points" of potential leaks was first determined by analyzing process diagrams using working drawings. Their preliminary estimated number was 7579. Of these, 270 "points" relate to auxiliary production, 498 – to the tank farm, that is, containers for storing the finished product, raw materials and reagents, intermediate semi-finished products that are involved in the production process, waste obtained in the results of side reactions, which are further processed into target products (7).

3. Results and their discussion

Based on the results of the application of thermal imaging monitoring technologies on process pipelines, units, vessels and apparatuses of the entire production, 7579 possible suspected leak points were analyzed. Out of a total of 7,579 points inspected, leaks were found in 29 points. Of these, 1 "point" related to the tank farm, the rest directly related to process equipment, communication pipelines, measuring circuit elements and actuators. All analyzes of fugitive emissions, namely their volumes, are calculated in kg for one year. Based on the results of the analysis and calculations, the total annual volume of fugitive emissions was established for the main components. The calculation results are shown in Figure 1.

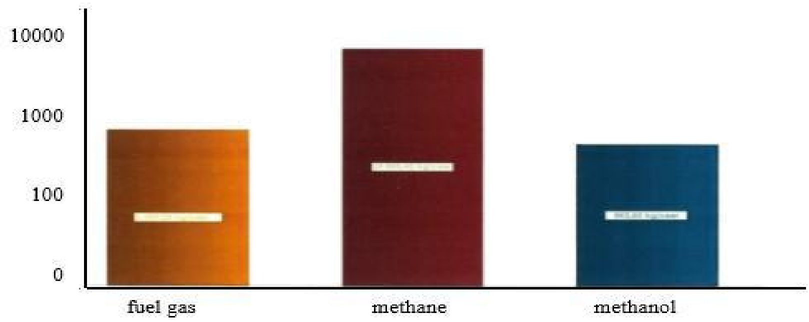

Fig. 1 Final estimated volume (mass fraction) of fugitive hydrocarbon emissions

If we calculate the volume of fugitive emissions of fuel gas - methane by type of element, then we can draw the following conclusions from the analysis data. Analyzes were carried out at 5188 "points", 24 of which were found to be leaking and only 4 of these "points" were repaired.

According to the analysis of fugitive methane emissions, several places of fuel gas leaks can be noted:

1) stuffing box - 1401.60 kg / year
2) threaded connections - 262.80 kg / year
3) other - 18331.03 kg/year

Total: 19995.43 kg / year.

Detection of leakage of fuel gas emissions - methane by type of element, was carried out using the thermal imaging method of photographing possible leakage points according to the technological scheme. The results of thermal imaging images of fuel gas leaks are shown in Figures 2, 3, 4, 5.

Ordinal number	Type of pipeline element fittings, apparatus,	unit
1	D-7 injector coupling (American)	Natural gas
Photograph of the object	thermal image	

Fig. 2 D-7 injector coupling (American)

Ordinal number	Type of pipeline element fittings, apparatus,	unit
2	Welded seam on the fuel gas line to the injector İ-5	Natural gas
Photograph of the object	thermal image	

Фотография объекта Тепловизионное из

Fig. 3 Welded seam on the fuel gas line to the injector I-5

Ordinal number	Type of pipeline element fittings, apparatus,	unit
3	Q-2 injector coupling	Natural gas
Photograph of the object	thermal image	

Фотография объекта Тепловизионное изо

Fig. 4 Q-2 injector coupling

Ordinal number	Type of pipeline element fittings, apparatus,	unit
4	Threaded connection of the flexible injector connection A-7	Natural gas
Photograph of the object	thermal image	

Фотография объекта Тепловизионное изобр

Fig. 5 Threaded connection of the flexible injector connection A-7

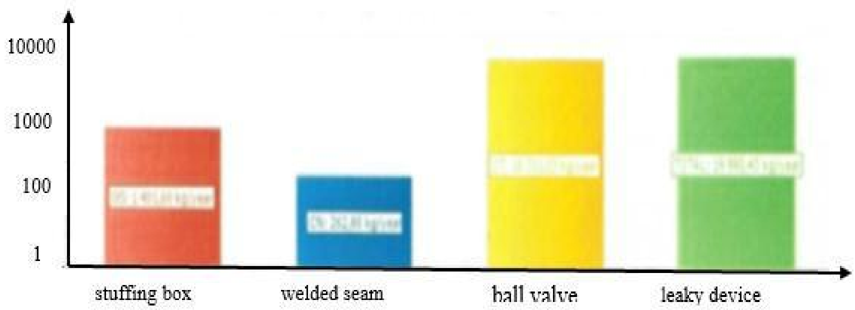

Fig. 6 Estimated volume (mass fraction) of fugitive emissions

And also according to the above analysis, it is possible to note specific places - equipment of fugitive emissions:

1) injector connection - 7992.42 kg / year:
threaded connection 1 – 7729.62 kg/year
threaded connection 2 – 262.80 kg/year
2) welded seam - 1927.20 kg / year
3) ball valve - 1401.60 kg / year
4) leaky device - 8674.21 kg / year
Total: 19995.43 kg / year.

A graphical representation of the results obtained is shown in Figure 7

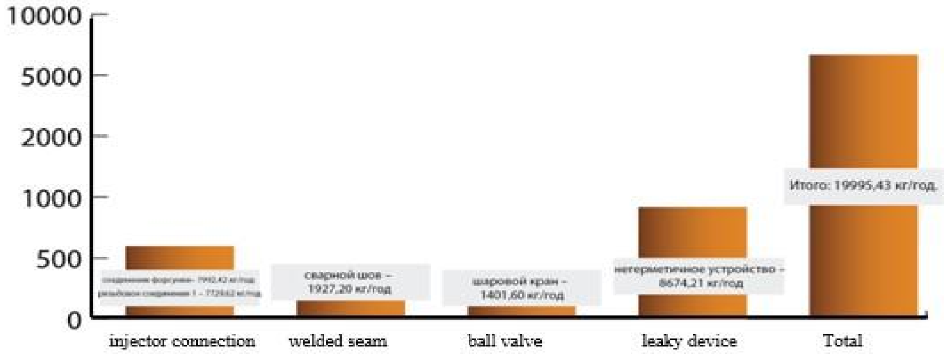

Fig. 7 Estimated volume (mass fraction) of unorganized fuel gas purifiers by position kg/year.

The second source of gaseous losses in the methanol production process is synthesis gas. It should be noted that gas synthesis technology differs in many respects from fuel gas technology. Accordingly, the checked control points are also comparatively smaller.
Analyzes were carried out at 601 “points”. Detection of mixed gas-gas leakage by element type was also carried out using the thermal imaging photography method with the possibility of replacing the leak according to the process flow diagram. The results of thermal imaging of synthesis gas leaks are shown in Figures 8, 9.

Ordinal number	Type of pipeline element fittings, apparatus,	unit
5	Threaded connection of the selection valve for the device pos.FE-2789 (HE-401)	syngas
Photograph of the object	thermal image	

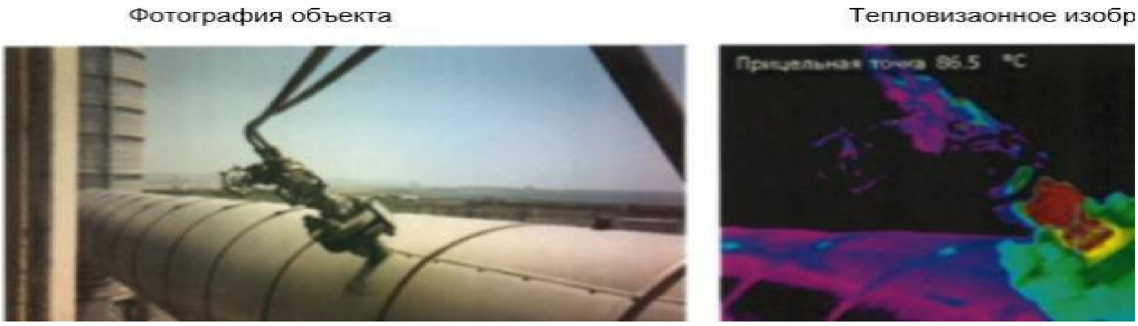

Fig. 8 Threaded connection of the selection valve for the device pos.FE-2789 (HE-401)

Ordinal number	Type of pipeline element fittings, apparatus,	unit
6	Threaded connection of the selection valve for the device pos.AT-18794 (R-401)	syngas
Photograph of the object	thermal image	

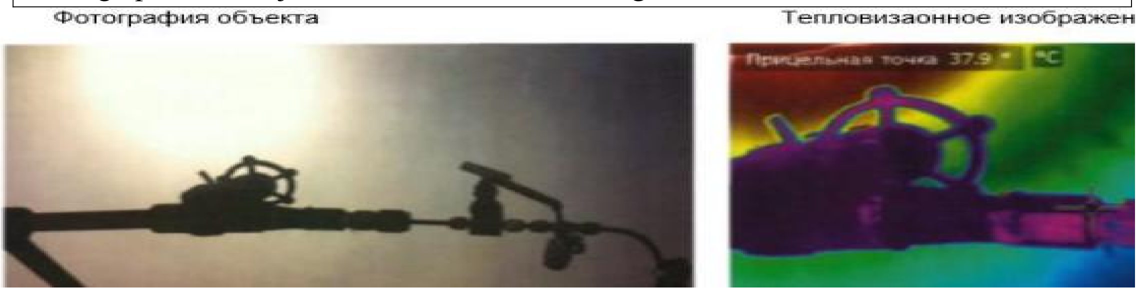

Fig.9 Threaded connection of the selection valve for the device pos.AT-18794 (R-401)

Based on the analysis of the estimated volume of fugitive emissions of synthesis gas by element type, the following results were obtained:
1) flange connections - 1471.68 kg/year
2) stuffing box – 525.60 kg/year
Total: 1997.28 kg/year.
A graphical representation of the results obtained is shown in Figure 10.

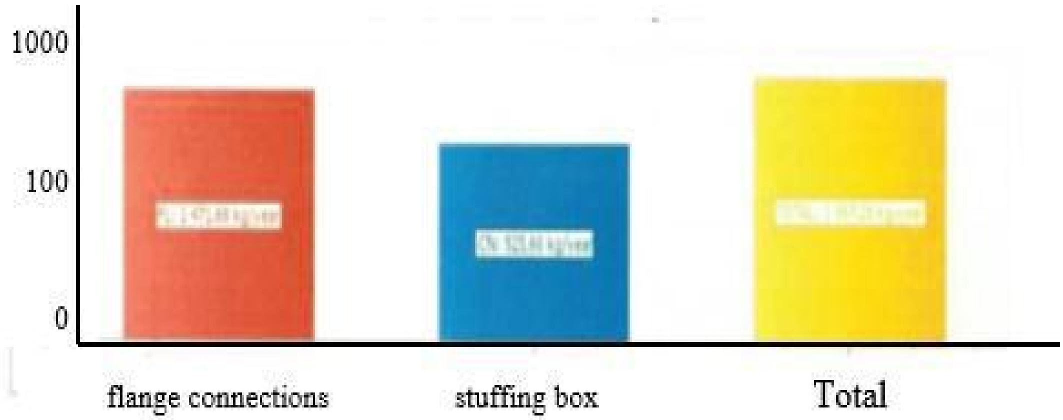

Fig. 10 Estimated volume (mass fraction) of fugitive emissions of synthesis gas kg/year.

A control analysis was carried out on a specific equipment position and connection point in the synthesis gas process loop and the following results were obtained:
1) flange connections - 735.84 kg/year
2) threaded connection - 525.60 kg/year
3) valve – 735.84 kg/year
Total: 1997.28 kg/year

A graphical representation of the results obtained for specific locations - fugitive emissions of synthesis gas equipment is shown in Figure 11:

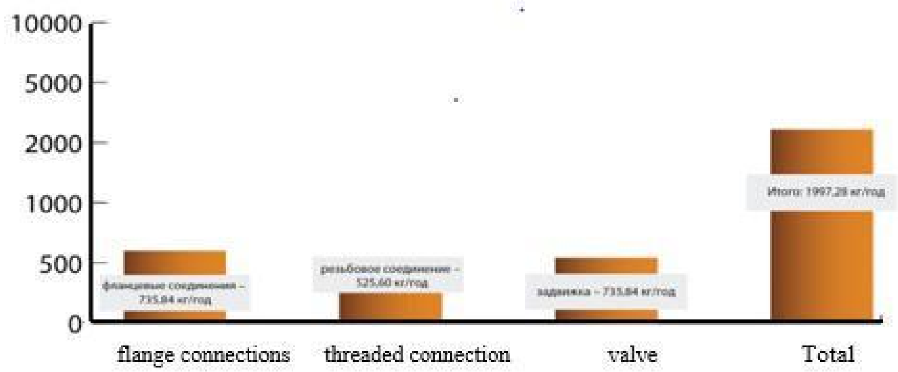

Fig. 11 Estimated volume (mass fraction) of fugitive synthesis gas emissions by position, kg/year.
As noted, the technological installation has 498 tank equipment. Taking into account the harmful properties of methanol, analyzes were carried out at 1790 "points". It was installed in one place - equipment for fugitive methanol emissions:

1) locking cap – 963.60 kg/year.

The photo image of the detected pass point is shown in Figure 12.

Ordinal number	Type of pipeline element fittings, apparatus,	unit
7	Tank gauge cover 24TK-0024	methanol
Photograph of the object	thermal image	

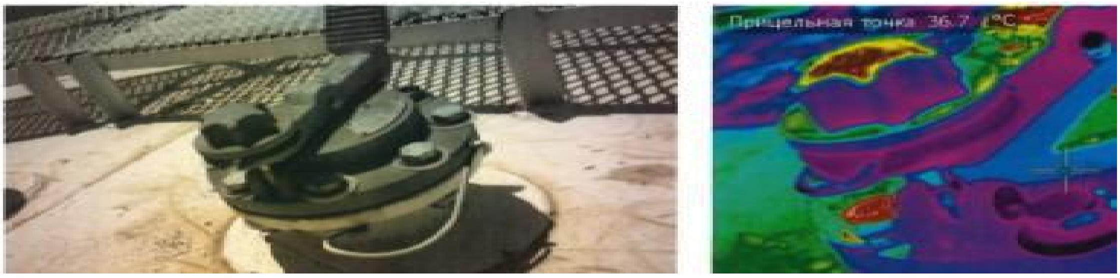

Fig 12 Cover of the tank measuring device 24TK-0024

A graphical representation of the results obtained for specific locations - equipment for fugitive methanol emissions is shown in Figure 13.

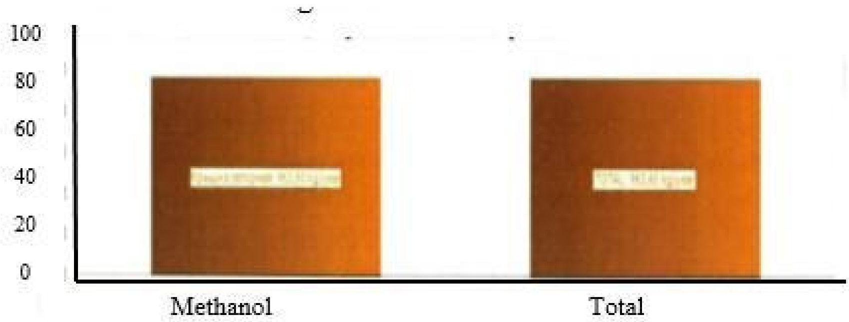

Fig. 13 Estimated volume (mass fraction) of fugitive methanol emissions by position, kg/year.

Particular attention must be paid to the drainage and transport communication hub. Because this system is quite highly mobile. During the day, connecting nodes undergo dynamic technological operations by connecting and disconnecting several times. This explains the high level of detected gaps.

Analysis of the above data shows that there is a high overall level of hydrocarbon losses and an extremely high level of hydrocarbon losses relative to the amount of fugitive emissions after a certain time of operation of the equipment. Based on this, after long-term operation of a production plant, it is necessary to conduct a control inspection of the technical condition of process equipment, communication pipelines, connecting units and seal tightness. Systematic qualification analysis of the state of unorganized emissions at a production enterprise also guarantees safety, explosion and fire safety, stable operation, and high economic efficiency.

4. Conclusions

According to the analysis results, it can be noted that the mass fraction of methane prevails and amounts to 19995.43 kg/year. The mass fractions of synthesis gas and methanol are 1997.28 kg/year and 963.60 kg/year, respectively. Consequently, the final calculation of the volume (mass fraction) of fugitive hydrocarbon emissions is 22956.31 kg/year. The number of inspected “points” of potential leaks using thermal imaging control technologies on process pipelines, units, vessels and apparatuses of the entire production is 7579. Of the 7579 inspected "points", 270 "points" relate to auxiliary production; 6811 - main production, 498 - tank farm.

In 498 tank equipment, analyzes were carried out at 1,790 "points" and only one was detected, and 6,811 points in the main production of 29 cases of fugitive emissions. It has been established that the main share of fugitive emissions comes from the methane technological communication system and logistics. Based on this, in the applied significance of this study, similar enterprises are recommended to systematize and strengthen control in the presence of such systems and components.

Conflict of interest

The authors declare that they have no conflict of interest in relation to this research.

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Influence of technological modes for manufacturing parts from plastic materials on the accuracy of their dimensions

N.A. Gasanova

Azerbaijan State Oil and Industry University,

Azerbaijan Republic, Azadlig Ave., Baku, AZ-1010 Azerbaijan,

Abstract. Constructions of oilfield equipment details (thread, cover, flange, etc.) can be made of various plastic materials. The influence of technological modes of casting on the quality of plastic parts of oilfield equipment is considered. In the manufacture of plastic parts from various compositions of press materials, the main technological factor affecting the quality of the parts is the casting regime. Based on the results obtained, modes are recommended for a specific brand of plastics used in oilfield equipment.