



24<sup>th</sup> World Gas Conference  
ARGENTINA | 2009  
5-9 October

The Global Energy Challenge:  
Reviewing the Strategies  
for Natural Gas

# Leak reduction at Mosgaz

Development and implementation of a  
natural gas leak reduction program for  
pressure regulation stations in the Mosgaz  
gas distribution system in Moscow,  
Russia



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- Aims and parties involved
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## Aims of the project

- Transfer of leakage reduction technology
  - Implementation of a program for detection and reduction of leaks in gas regulating stations
  - Performing a pilot project
- Reduction of methane emissions by > 90 %
- Introduction of new leak detection equipment
- Introduction of new types of sealants and gaskets for repair



## Parties involved in the project





## Project program

- Selection of a number of representative gas regulating stations
- Identification, classification and quantification of all leakages for these stations
- Training of staff of Mosgaz
- Development of a repair program
- Repair of all leakages
- Evaluation of the project



## Characteristics of Mosgaz

- Turnover 29 billion m<sup>3</sup> natural gas to industrial and domestic clients
  - 2.500 industrial companies
  - 70 district and block heating stations
  - 2.000.000 apartments
- Length of network about 7.320 km
- 396 pressure regulating stations in operation



## Pressure regulating stations operated by Mosgaz

- 396 stations in operation
  - inlet pressure 3 -12 bar
  - capacity up to 300.000 m<sup>3</sup>/h
- The oldest station dates from 1949 and the median construction year is 1994



## Selection of gas regulating stations

- Provisional leakage measurements
- Selection of 10 representative stations
- Selection of 5 stations to be repaired



## Applied leak measurement methods

- Soapy solutions (qualitative)
- Gas detection apparatus (EX-TEC) for qualitative measurements
- Hi-flow sampler for Quantitative measurements (Heath Consultants)



**EX-TEC SR6  
(Sewerin)**



**Hi-flow sampler  
(Heath Consultants)**









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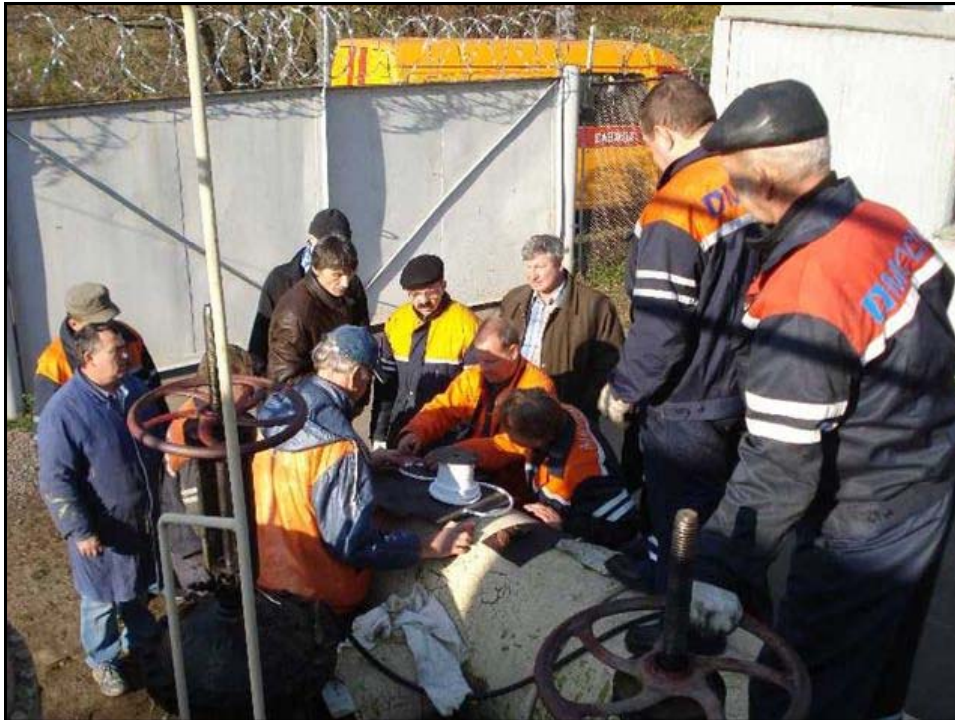
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## Training of staff of Mosgaz

- Study tours to The Netherlands
  - Visits to gas utilities
  - Visits to manufacturers of measuring equipment and repairing materials
  - Exchange of experiences
- On site training in Moskow



## Training on the job







## Results: classification and quantification of leakages in 5 selected stations

Component	Number	Total leakage m <sup>3</sup> /yr
Stem packing	40	40.280
Threaded Fitting	52	14.166
Flange	23	12.554
Plug	7	1.687
Union	1	494
Diaphragm	3	131
Valve stem	2	0
<b>Total</b>	<b>128</b>	<b>69.313</b>



Gate valve



Plug valve



Ball valve



Safety shut off valve



Sealed/greased plug valve



**Stem packings were responsible for the majority of leakages**

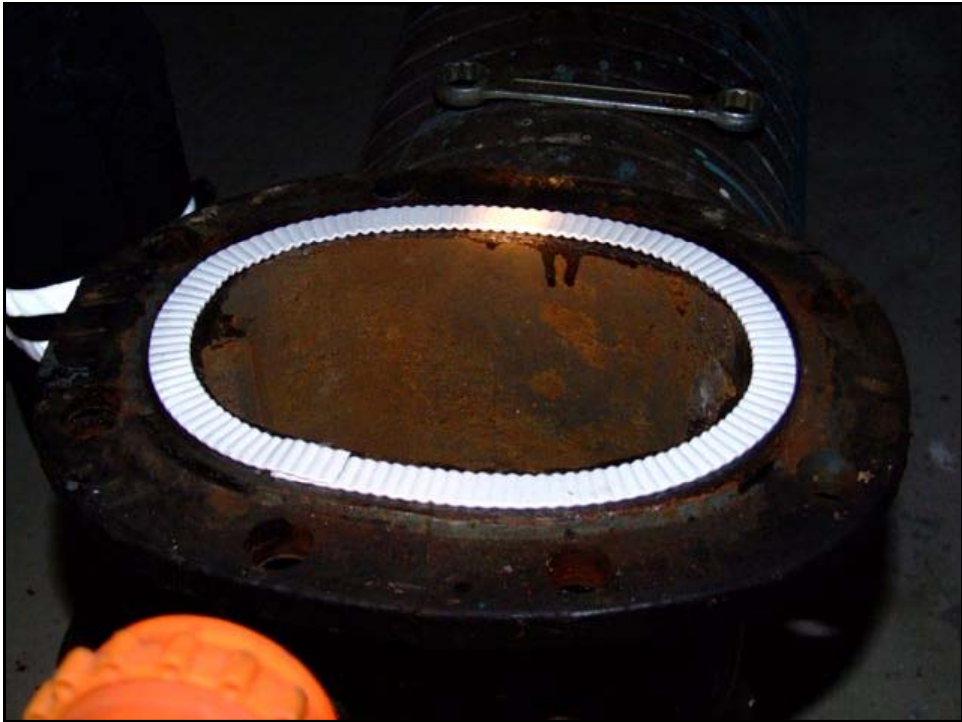


**Pressure regulating runs**



**Detail of leaking stem packing**

















## Results: After repair

- After Repair only 930 m<sup>3</sup>/yr leakage remained
- 98.7 % leakage reduction
- Only one leak was not repaired correctly



## Extrapolation of the results to the total of 398 Mosgaz stations

- A reduction of 5 million m<sup>3</sup> natural gas might be possible
  - This is the use of gas of a small town in the Netherlands (about 10,000 inhabitants)
  - The amount of escaped gas represents a value of about € 250,000



## Conclusions

- With good qualitative sealants and gaskets almost an 100% tightness result could be reached
- The cost of sealants and gaskets are rather low, the major part of the costs is due to organisational and installation work
- Assuming that Mosgaz is representative for all other companies in the world, a considerable reduction of greenhouse gases could be achieved worldwide



## Lessons learned

- Combine a leakage reduction program always together with a periodical maintenance program
- The amount of work could be reduced considerably by making a critical selection of components and leakages quantities into acceptable and unacceptable
- Critical leakages should be considered first
- Qualified and skilled staff give a maximum result



## Preguntas - Fragen - Questions

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