

Safety measures
for transmission pipeline transport
of natural gas and hazardous
liquids in the Russian Federation

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Topic

- Current situation on transmission pipelines in the Russian Federation
- Lesson learned from accidents on transmission pipelines
- Suggestions for safety guidelines

Introduction

- Risk management in oil and gas activities has the key role in assuring the acceptable safety level
- Uncontrolled release of natural gas and hazardous liquids is the main contributor to the total risk
- Risk analysis for pipeline systems should be planned, carried out used and updated

Quality of Risk analysis

Quality of risk analysis depends on three aspects:

- A thorough understanding of the system and its operational characteristics
- The proper use of risk analysis methods
- High quality risk input data

Role of risk analysis

- Risk analysis is to be seen as a “living document”
- Proper risk analysis may have large effect on the system and may indicate whether or not companies should take additional protective measures

Some historic data

The beginning of the Russian transmission pipeline networks can be traced back to:

- 1908 for oil pipeline
- 1944 for natural gas pipeline

The both pipelines still in operation

About the Russian pipeline grid

Total length of transmission pipelines – 230 000 kilometers, including:

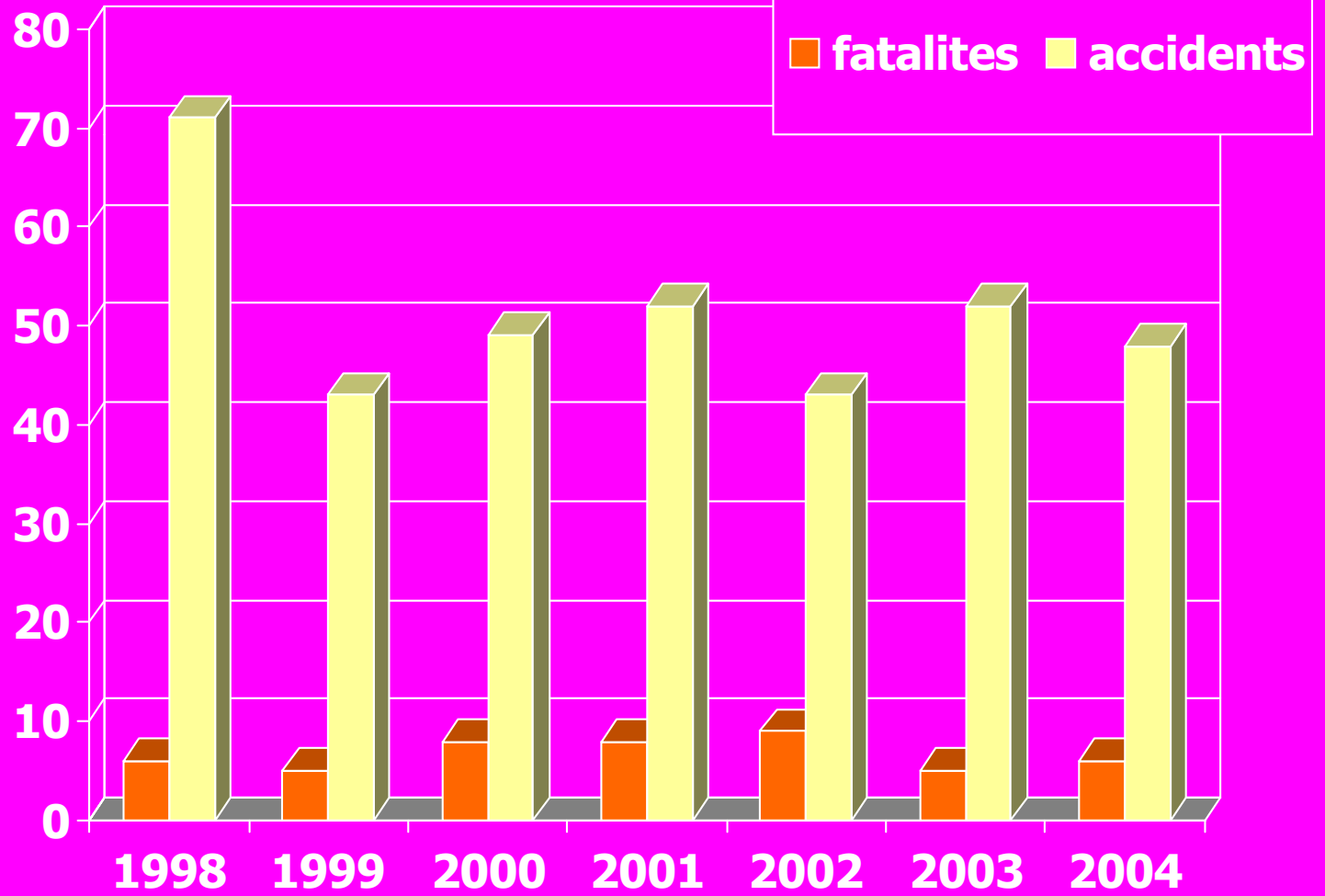
- 143 000 natural gas pipelines
- 87 000 hazardous liquids (oil, condensate, petroleum products, liquid petroleum gas, liquid ammonia).

There are more than 6000 river crossings of pipelines

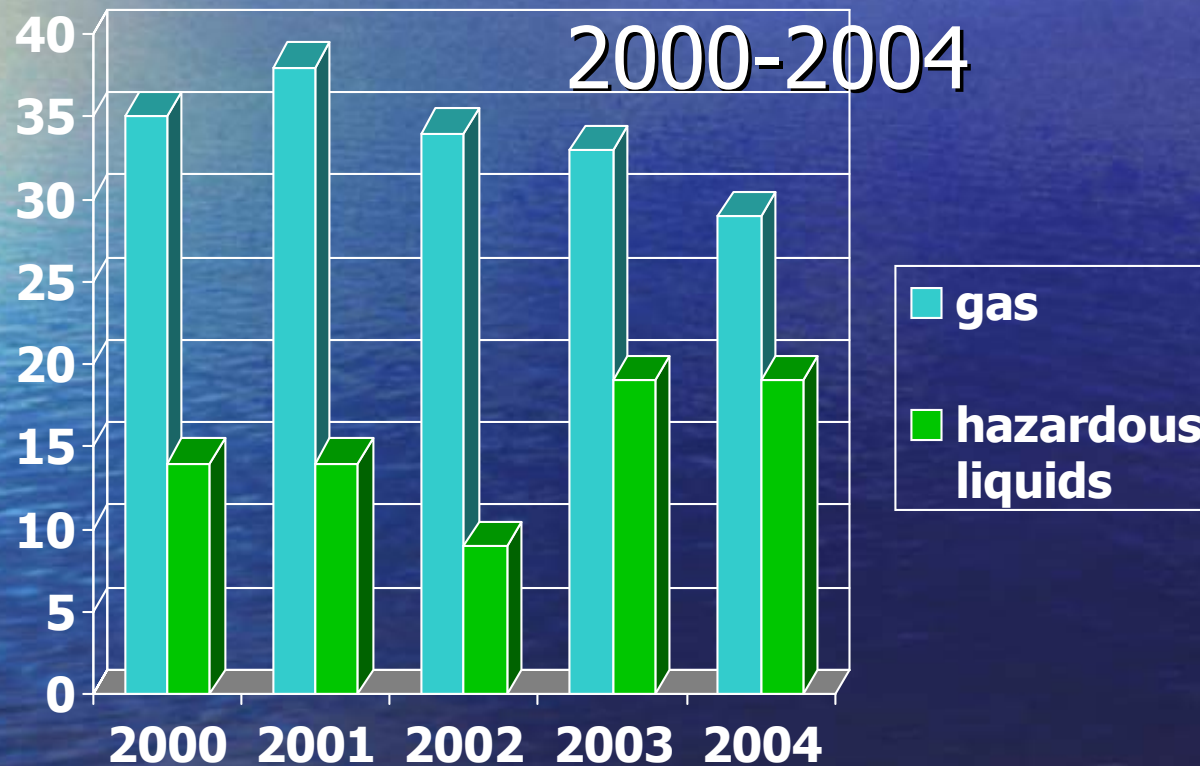
Key indicators of transmission pipeline safety performance

- Fatalities
- Accidents , including ruptures, spills, leaks and releases

Total number of fatalities and accidents



Number of accidents on gas and hazardous liquids yearly



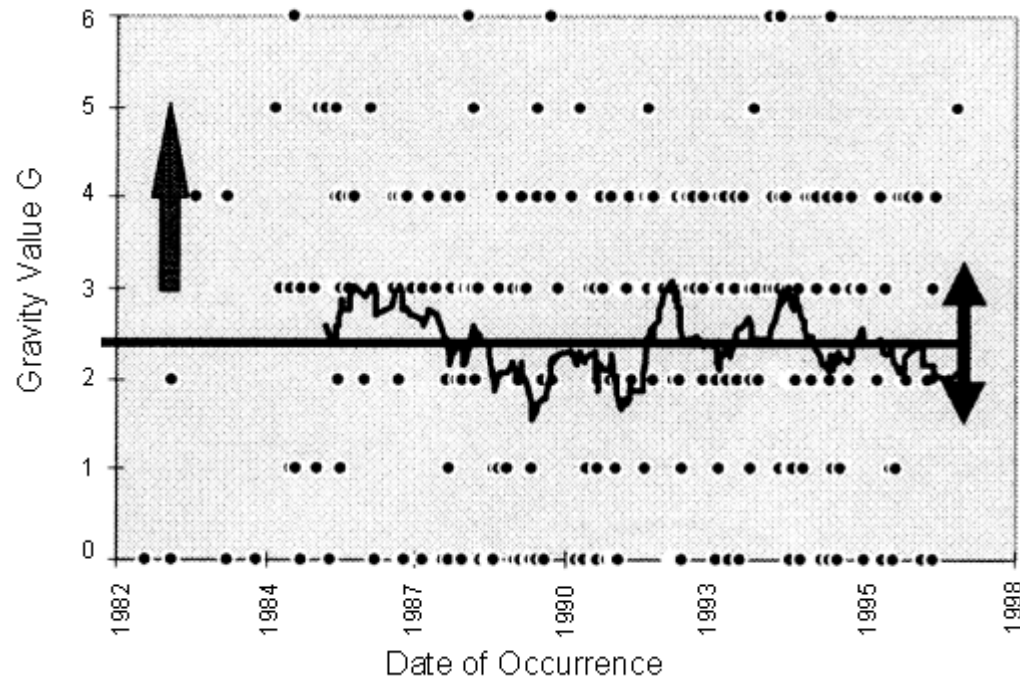
Analysis of statistic

It is obvious :

- There are no significant improvements on gas pipelines
- There are certain problems on hazardous liquids pipelines

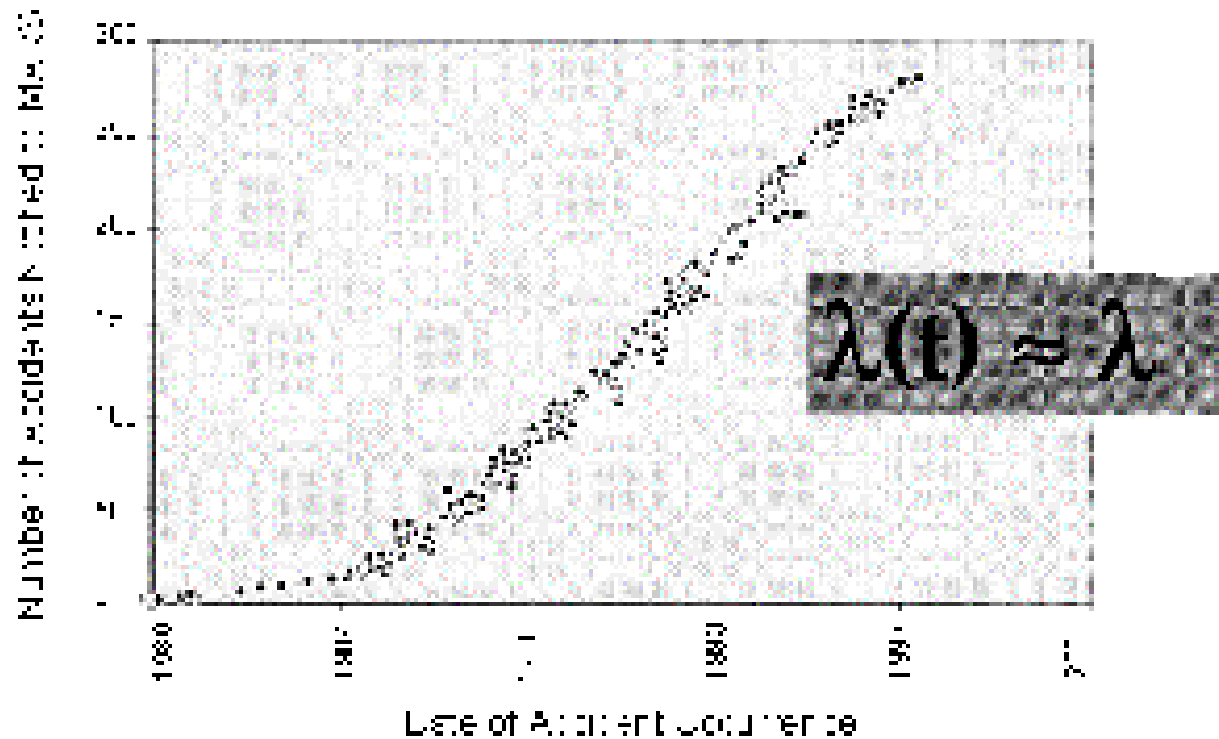
Safety performance indicators should be more reliable

Accident Severity Trend under Seveso 1 Directive



- No real change to severity of accident
- EU experienced worst ever accident in 2001 (Toulouse AN explosion)

Accident Frequency Trend Under Seveso 1 Directive



- No change to rate of accident
- Constant rate over 6 year period after introduction of safety case regulations

Causes of accidents on transmission pipelines

- External corrosion/stress corrosion - 31%
- Construction defects and damages – 29%
- Damages from outside forces –23%
- Material defects – 12%
- Operator error – 5%

Lesson learned from accidents on transmission pipelines

Main treats to pipeline integrity:

- Third party damage
- Stress corrosion cracking
- Construction defects
- Natural forces
- Low quality of risk analysis
- Poor management system

Suggestions for safety guidelines (1)

- To develop meaningful , comparable and useful safety performance indicators for pipeline systems
- Establish and run planned integrity programs. Probabilities-reducing measures shall be given priority over consequence-reducing measures

Suggestions for safety guidelines (2)

- Establish a high quality “third party” inspection
- Use proactive engineering design on river crossing
- Establish local notification programs about digging activities in highly populated areas

Suggestions for safety guidelines (3)

- Pipeline safety should comprises technical safety, working environment, ecological issues and economic values

Integrated safety content has to be evaluated as a totality

Learning from all kind of serious accidents shows the importance of setting the goal oriented regulations for pipeline systems

Suggestions for safety guidelines (4)

- To prepare the Goal oriented regulation for pipeline systems

Goal setting regulations had to be explained to ensure predictability.

This problem should be solved by issuing detail guidelines

To develop them is one of this workshop task



Thank You for attention

Any questions?