

Safety and Integrity of Pipelines - Concepts and Measures –

*Sicherheit und Integrität von Pipelines
- Konzepte und Maßnahmen -*

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**UNECE Workshop on the Prevention of Water Pollution due to Pipeline Accidents
Berlin, 8-9 June 2005**

1. Safety Concepts: deterministic – probabilistic

Sicherheitskonzepte: Deterministik – Probabilistik

2. Technical and organisational aspects of pipeline safety

Technische und organisatorische Aspekte der Pipelinesicherheit

Planning

Construction

Pipeline Management System

3. Summary

Zusammenfassung

1. Safety Concepts: deterministic – probabilistic

Sicherheitskonzepte: Deterministik – Probabilistik

- **the deterministic safety concept:**
 - **experiences of many years**
langjährige Erfahrungen
 - **analysis of causes**
Ursachenanalyse
 - **precautionary principle**
Vorsorgeprinzip
 - **Guidelines**
Regelwerke

- **the probabilistic safety concept:**
 - **the overall risk, consideration of the complex coherences**
Gesamtrisiko, Betrachtung der komplexen Zusammenhänge,
 - **systematic identification and assessment of risks**
systematische Ermittlung und Bewertung von Risiken
 - **Qualitative risk assessment (RA),**
Quantitative RA with mathematical and statistical tools,
Semi-quantitative RA,

2. Technical and organisational aspects of pipeline safety

Technische und organisatorische Aspekte der Pipelinesicherheit

A. Planning

Routing / Leitungsführung

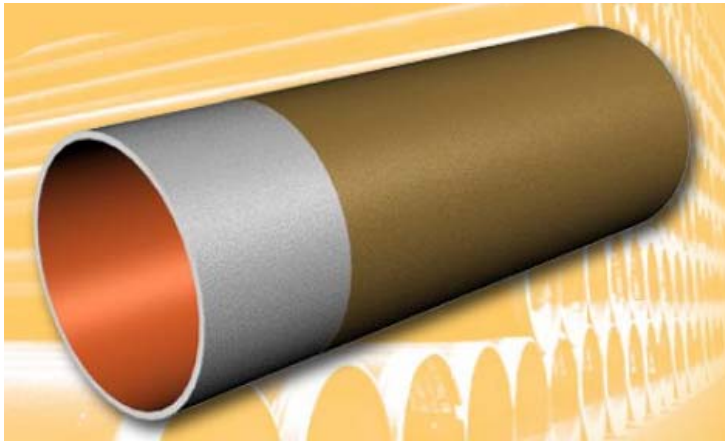


Design



... and others

Corrosion protection



passive



active

Fire / Explosion protection



Pig stations / Molchschleusen



A. Planning

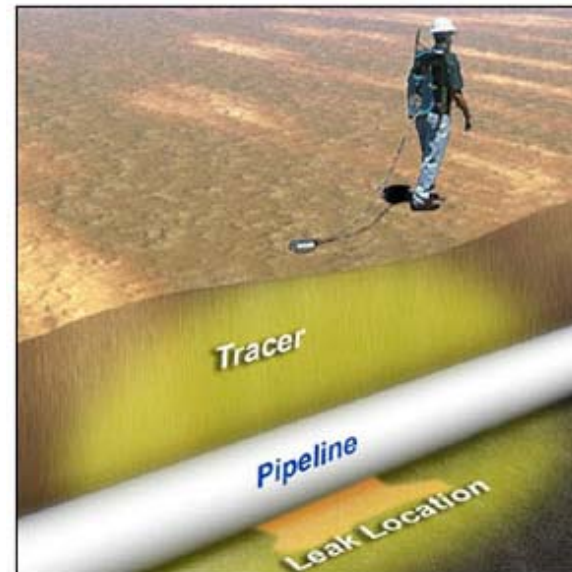
Safety Devices:

- measuring systems: pressure, temperature
- pressure / temperature reducing systems,
- shut off valves



- leak detection systems

- mass balance methods
- pressure changes
- pressure waves
- software based methods: Real Time Transient Modeling ...
- detection of substances (cable sensors, vapor monitoring, fiber optic technology, ...)



B. Construction



C. Commissioning / Inbetriebnahme:

Testing of / Prüfung von

- **construction work / Bau- und Verlegearbeiten**
- **safety devices / Sicherheitseinrichtungen**
- **strength, leak tightness / Festigkeit, Dichtheit**



D. Pipeline Integrity Management System

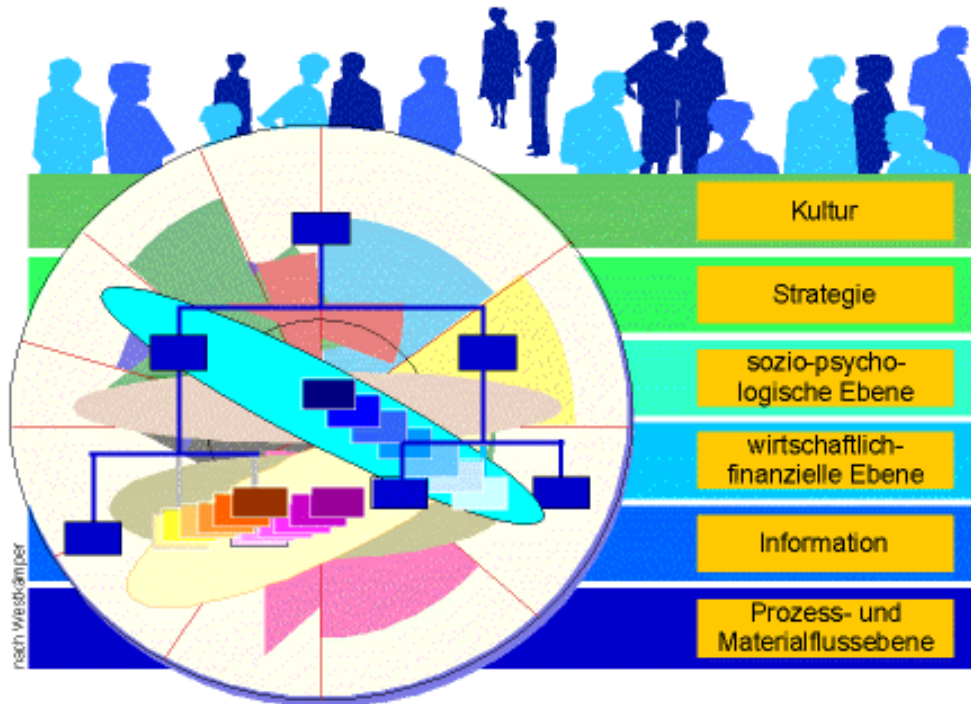
Safety / Sicherheit

Reliability / Zuverlässigkeit

Costs / Kosten

Risk Management

Company Organisation / Betriebsorganisation



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Pipeline Integrity Management System



Federal Institute for
Materials Research
and Testing

Company Organisation

Surveillance / Überwachung

Testing / Prüfung

Maintenance / Instandhaltung



Risk Management



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Your pipeline.

If **THESE PEOPLE** know that your pipeline is near, they will notify you of impending danger with the excavator.

Prevention of Third Party Interference / Vermeidung von Einwirkungen durch Dritte



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Risk Management

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Company Organ



Risk Management

Surveillance



**Training / Education /
Schulung**

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Risk Management

Surv

Testin

Mainten

Prevent



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**Emergency Planning /
Notfallplanung**

Training / Education

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Pipeline Integrity Management System

Company Organisation



Maintenance

Documentation



Emergency Planning

Prevention of Third Party Interference

Education

Risk Management

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Pipeline Integrity Management System

Company Organisation

Risk Management

Risk Communication

„Right to Know“

- internet presentations about the pipeline
- public events (Workshop, presentations, ...),
- information brochures, maps, films
- News Letter
- emergency information,
- ...

Documentation

Emergency Planning

Training / Education



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Pipeline Integrity Management System

Company Organisation

Surveillance

Risk Communication

Testing

Documentation

Maintenance

Emergency Planning

Prevention of
Third Party Interference

Training / Education

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Risk Management

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3. Summary / Zusammenfassung

- different approaches to decide what is safe**
- high technical safety level**
- Pipeline Integrity Management System**
- transboundary pipelines**
 - control of risk**
 - emergency planning**
 - risk communication**

THANK YOU!

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