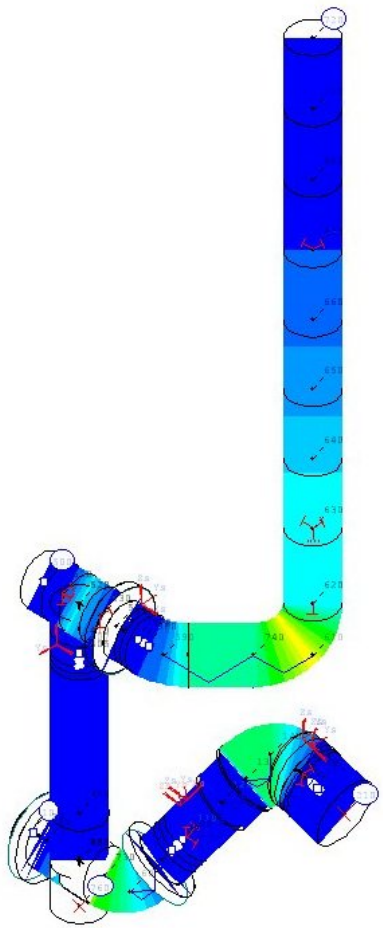
Wölfel
Beratende Ingenieure



Safety Assessment and Lifetime Management of Piping Systems

Salmaps

Health monitoring of non-accessible pipes

Mainly WP 2, 5, 7, 8

Friedmann (WBI), Henkel (WBI),
Petricevic (NMWü), Schubert (EADQ)

Integrated Pollution Prevention

Wölfel
Beratende Ingenieure

EU demand to an integrated pollution prevention and control

Piping systems for the transport of dangerous fluids have

- to be designed and dimensioned according to the relevant codes

Thereafter they have

- to be inspected in regular intervals
  or
- to be permanently controlled by methods of health monitoring

However in some plants piping systems exist with non-accessible pipes

It must be possible to control these pipes, too

- Health monitoring of non-accessible pipes

Health Monitoring of non-accessible Pipes

Wölfel
Beratende Ingenieure

For conventional methods of non-destructive inspections direct access to the pipe is necessary

Therefore

- development of new sensors with remote control ability
- monitoring of the sensor signals, detection of changes
- development of methods for the interpretation of sensor signals (pattern recognition)
- development of new criteria for the risk assessment
- integration into the decision support system

New Materials and Wave Propagation

Wölfel
Beratende Ingenieure

- ultrasonic wave source working as actuator and sensor within the required frequency range
- continuous monitoring of reflected waves
- changes in the wave field initialise a self-test of the piping system (e. g. pressure surge)
- interpretation of the wave field with respect to possible damages of the pipes
- safety assessment of the pipe

Piping System for Research and Validation Tests

Wölfel
Beratende Ingenieure

- construction of a typical mock-up (different pipe supports with gaps, friction, line stops, spring hangers etc.)
- system identification, model updating
- damage tests
- safety assessment of the piping systems with conventional and new methods
- comparison of the accepted method of safety assessment (state of the art) and the new method

Test of Prototype and Demonstration of the DSS

Wölfel
Beratende Ingenieure

- application of the new sensors and actuators to the piping system
- packaging with the software
- alpha and beta testing
- shaking table demonstration