Pressure Shock Consideration
From the ANALYSIS to the SOLUTION
For water, sewage and chemistry applications
ON THE BASIS OF OUR VISIT IN YOUR COMPANY

Visit at site, project discussion and project support to the implementation

We make simulations, calculations and proposals and pressure measurements at site (with concluding report). With our flow simulation system, we make calculations and simulations of pressure surges and negative pressure in pump stations or pipe systems. The most frequent calculations are emergency shut-downs for pumps, opening and closing of hydrants and valves and the sourcing of big quantities of water.

With the clear graphic representations, we offer you an interpretation of the system conditions by referring to potential problems. We also make solution proposals.

Our attractive calculation models:

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<th>BASIC</th>
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<td><strong>One Line System</strong></td>
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<td><strong>Performance Overview</strong></td>
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<td>• Registration of plant data</td>
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<td>• Plant modelling</td>
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<td>• Graphic representation</td>
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<td>– Plant schema</td>
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<td>– Pressure gradient without safety elements</td>
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<td>– Pressure gradient over length/height profile without safety elements</td>
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<td>– Pressure gradient over length/height profile with safety elements</td>
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<td>• Elaboration of the solution proposal</td>
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<td>– Determination of the shock absorbers and/or aeration/ventilation valves</td>
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<td>• Cost estimate for the solution</td>
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<td><strong>More Line System</strong></td>
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<td><strong>Performance Overview</strong></td>
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<td>• Calculation of more lines, including their graphical representation</td>
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<td><strong>More Line System with Report</strong></td>
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<td><strong>Performance Overview</strong></td>
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<td>• Elaboration of a detailed report and a reporting with additional graphics</td>
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<td>• Detailed recommendations for the use of the safety elements</td>
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<td>• Option: German or English</td>
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« Simulation leads to innovation – and is fun. »

Christoph Meier, Romeo Tedaldi, Frei + Krauer AG
LET US MODEL YOUR SYSTEM.

System modelling

To analyse your situation, we need the following documents

• **Indications about the property**
  - Exact project designation, place, country
  - Type of medium
  - If available, local (new or existing) conditions

• **Length and height profile**
  - Profile of the conduct with length and height indications
  - Coordination of changes of materials or pipe dim

• **Performance-related indications**
  - Length of partial sections
  - Materials of partial sections
  - Diameter of partial sections
  - Approximate age of the pipes

• **Do you have inlet pressure or inlet pipe?**

• **Indications about the pump or pump diagram**
  - Dry well installation/underwater pump
  - Number of pumps, parallel or series connection
  - Volume flow Q in m³/h
  - Delivery head of the pump in mWS
  - Rotation in in U/min
  - Performance in kW
  - Degree of efficiency in %

• **Other indications or documents**
  - Are there safety elements?
  - How are the special conditions at site?
  - Do we need a seismographic calculation of this region?
  - etc.
ANALYSIS OF THE EXISTING SITUATION AND ELABORATION OF THE ADEQUATE SAFETY CONCEPT

Interpretation and Solution Proposals

Which are the problems existing in your net?

Pressure gradient in the pump system during the emergency stop without safety element

- A strong pressure fall and pressure increase within seconds. Pressure peaks $\Delta P$ over 14 bar.
- The pressure wave flows back to the pump station after 10 seconds and becomes positive.
- A negative pressure wave is released and flows into the direction of the discharge.
- An under-pressure is formed and, as a consequence, foreign materials from the environment can be sucked into the piping system.

Pressure gradient over the whole length/height profile without safety

- Negative pressure over the whole pipe profile. Unnecessary charge of the pipe and risk of pollution by the aspiration of wastewater during the phase of negative pressure.
Interpretation of the Safety Concept

What we offer for your safety?

The shock pressure absorber pushes water behind and reabsorbs water after the inversion of the water column. By using a correctly sized safety element, the $\Delta P$ amounts only to 5 bar. The pump and the pipes are not charged if it is not necessary.

In the whole pipe net there is no negative pressure / no cavitation anymore.
Conception and dimensioning of the safety elements

Conception of shock pressure absorbers, expansion tanks and pulsation absorbers and aeration and ventilation valves.

Contrary to expansion tanks or pressure maintaining tanks the shock pressure absorbers by OLAER are especially designed for extreme pressure variations.

This requires a respective construction of the tanks, solution-specific and high-quality elastomers and flange connections designed for the respective application.

<table>
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<tr>
<th>Standard range of shock pressure absorbers</th>
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<td>Volume range</td>
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<td>Pressure range</td>
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<td>Construction</td>
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<td>Forced flow</td>
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<td>Bladder material</td>
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**Forced Flow**

With the patented forced flow, the constant water exchange is carried out in addition by an external conduct.

With the assembly of a small arch against the current in the main pipe a small section narrowing is created. So approx. 1-2% of the current output flow through the bypass pipe into the absorber and finally back to the main pipe through the main connection.

**Damper advantages**

- Operates without external energy
- Minimum space requirements
- Cost saving on the building
- No vessel corrosion
- Long service life
- Low maintenance
- Controlled water exchange in vessel (Forced Flow)
Assembly in our workshop and putting into operation at site

Now we get the system running...

The digital level display permits an easy monitoring of the water level in the pressure chock absorber. Through a differential pressure measurement the water column is displayed in centimetres in the tank. The display device is battery-operated or is used by an interface with external current supply to permit a constant monitoring.

After Sales Service

Maintenance and control are part of our services. With a maintenance contract, the company ORELL Tec guarantees a regular maintenance and control of this important protection device.

TÜV-/SVTI Test

We are glad to give you an information about if the tank must be checked or not. We accompany and support you as well during your regular check with the inspection offices. Please inform us on time about the deadline of the inspection citation.
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