SUNRISE

PIPENET™ NEWS

VOLUME 2 ï ISSUE 7 February 2011

LEADING THE WAY IN FLUID FLOW ANALYSIS

Welcome to the PIPENET e-newsletter!

Contents:

PIPENET

NEWS!

PIPENET Vision 1.5 is now available!

PIPENET Vision 1.5 is being sent to all subscribers to PIPENET Maintenance, Updates and Support. If you would like to receive a copy, email us with your company name and contact details at:

pipenet@sunrise-sys.com

We look forward to hearing from you!

NEWS!

PIPENET Vision 1.5 *out now*

PIPENET 1.5 is now available! It contains powerful new capabilities in all of the **PIPENET** modules.

Please see page 2 for full details of the exciting new range of feature additions and enhancements now available to **PIPENET** users.

Also included in this edition is news of our work towards new demonstrations and releases, and of course, an edition of **PIPENET** News would not be complete without some examples of how to make the best of **PIPENET.**

We hope you will enjoy it!

PIPENET Vision 1.5 *includes…*

Transient module enhancements

- New graphing tool, with improved user interface and capabilities including superimposition of multiple graphs.
- Open channel cavitation algorithms have been significantly upgraded - covering bubbly, slug, and stratified flow types.
- New simple tank types (vertical cylinder, horizontal cylinder, sphere, cone frustum).
- New accumulator types (vertical cylinder, horizontal cylinder, sphere).
- New surge tank types (vertical cylinder, horizontal cylinder, uniform section, cone frustum).
- New receiving vessel types (vertical cylinder, horizontal cylinder, uniform section, cone frustum).
- New pipe bundle component - a single component representing the hydraulic characteristics of a bundle of hundreds or even thousands of pipes).
- New Signal Selector component, to find the minimum/maximum of two input signals, or switch from one input signal to another after a defined time period.
- Limiting Power Ramp option for Transfer function (enabling different ramp up and ramp down response rates).
- Receiving vessel model extended to allow the specification of various types of weir.
- Vacuum breakers can now be defined to operate only within a given time period, staying closed outside that period.
- Pressure and pressure-difference sensors are now recognized for both the analogue and digital options, whereas previously they were always assumed to be analogue.

Standard and Spray/Sprinkler module enhancements

- Save time - New elastomeric valves achieve the required input pressure, output pressure, pressure drop or flow rate without the need to input the valve characteristic data.
- Use right mouse button menu to turn nozzles within defined area on/off in the Spray/Sprinkler module.
- Stand-alone program to convert a results file (SRF) to a spreadsheet.
- The Edit Pipe type dialog now checks that increasing bores correspond to increasing flow-rate (calculated from the velocity and the pipe internal bore.)

Great extra enhancements!

- Components now only change colour from blue to black when all mandatory attributes have been given valid values.
- The Options>Units tab now initially appears unexpanded, to make it easier to find and change the units of interest.
- Formatting of decimal numbers has been improved, and the requested precision is now saved correctly between sessions in all cases.
- Component types now appear alphabetically in the Data View window ñBrowseò selector.
- The size of network that can entirely be displayed within the view window has been increased.

New developments in PIPENET Vision 1.5 – In Use

The next few pages are packed with information on the new features in **PIPENET** 1.5

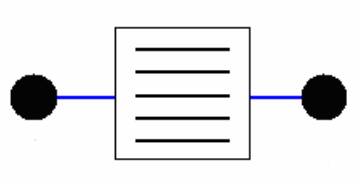
New Features in PIPENET Vision 1.5 Transient Module – Pipe Bundle

Heat exchanges and condensers can be composed of hundreds or even thousands of parallel pipes with the same diameter and similar length. Clearly it is impractical to model each individual pipe in such cases. PIPENET 1.5 contains a new component called a ñpipe bundleò to solve this problem.

Label	1	
Input node	1	
Output node	2	
Number of tubes in the component	5	
Inside diameter	50	mm
Length	10	m
Net height change	0	m
Roughness or C factor	0.05	mm
Additional K factor	0	
Status	leak	
Leak area	100	mm^2
Leak time	5	sec
Developing time	10	sec
Back pressure	50	psi G
Results selected?	NO	

The pipe bundle allows a single component to represent the hydraulic characteristics of these collections of pipes, allowing the user to optimise the pipe size and explore emergency conditions such as rupture and leak.

The new component looks like this in the user interface:



You can see from the screen capture what parameters are required for the new component.

The ñStatusò can take one of four values, each of which may require further parameters: normal, leak, break or block.

Block

- Block number: the number of the pipe which is blocked.
- Block time: the time at which the blockage occurs.

Break

- Break number: how many pipes are broken
- Break time: the time at which the breakage begins.
- Developing time: the elapsed time between the leak starting and becoming fully developed.
- Back pressure: the outside pressure of the tubes, e.g. shell side pressure.

New Features in PIPENET Vision 1.5 Transient Module – Tank Types

Accumulators, Simple Tanks, Surge tanks, and Receiving Vessels all have new options to specify their geometry ï this is the full list:

- Simple tank types: vertical cylinder, horizontal cylinder, sphere, cone frustum.
- Accumulator types: vertical cylinder, horizontal cylinder, sphere.
- Surge tank types: vertical cylinder, horizontal cylinder, uniform section, cone frustum.
- Receiving vessel types: vertical cylinder, horizontal cylinder, uniform section, cone frustum.

The properties dialog for each of these tank types has a new option allowing you choose the desired geometry type, after which itôs simply a matter of filling in the shape parameters. Hereôs an example of an accumulator:

Label	1	
Input node	1	
Type	Vertical cylinder	
Diameter	500	mm
Height	2	m
Reference Fluid D...	1	m
Reference gas	Diatomic gas	
Heat capacity ratio	1.4	
Reference Gas Te...	20	°C
Reference Gas Pr...	3	Bar G
Results selected?	NO	

New Features in PIPENET Vision 1.5 Transient Module – Channel Cavitation

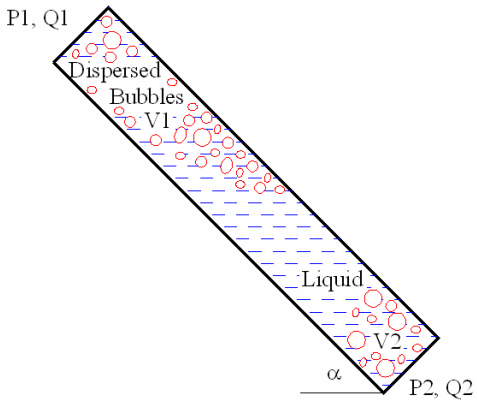
Vapour cavitation occurs in a system when the pressure at a point falls below the fluid vapour pressure. The fluid vaporises, forming a cavity in the system. Cavitation generally occurs in the higher parts of the network, where the pressure due to static head is less. When the pressure rises back above the fluid vapour pressure the vapour condenses and the cavity collapses. The collapse of a cavity can cause a very large pressure surge to occur and must be avoided by careful design of the system.

PIPELINE Transient provides for two cavitation models;

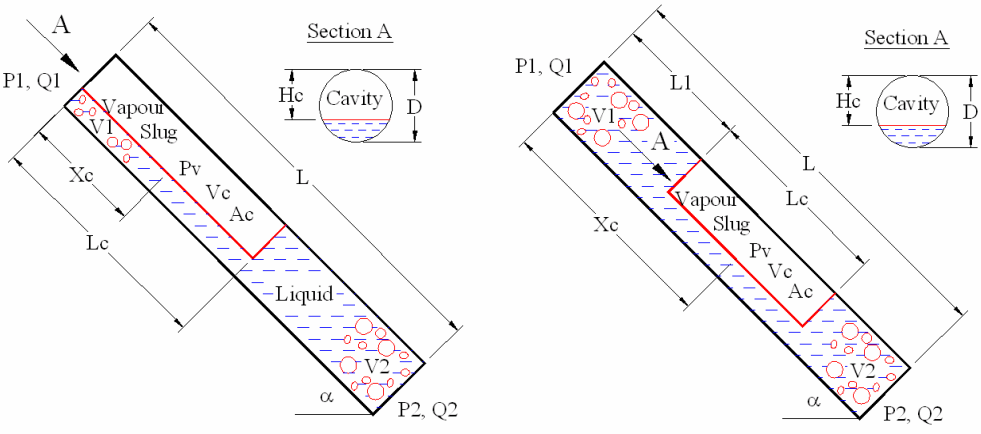
- vapour cavitation
- channel cavitation.

While vapour cavitation is intended to model the growth and collapse of cavities and the consequent pressure surge in the system, it cannot predict vapour bubble formation, so it does not take into account the effect this has on fluid flowing through components. In particular, pipes - where the majority of cavities form - continue to behave as though they are completely full. As a result of this, the phenomenon known as "slack line flow" or "open channel flow" is not experienced if the presence of cavities is modeled using the vapour cavity model. The open channel cavitation model is intended to remedy this.

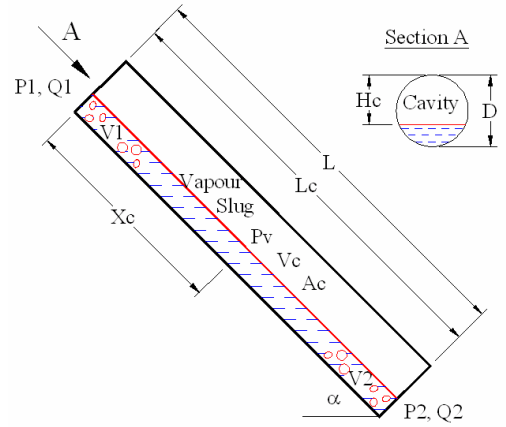
In PIPENET Vision 1.5, the open channel cavitation algorithms have been significantly enhanced and validated to provide an unparalleled level of modeling realism. Specifically designed to be applicable to pipes, it realistically models the flow through pipes when a section of the fluid in the pipe is actually vapour. Three distinct types of flow ï bubbly, slug, and stratified ï are recognized:

Bubbly	

PIPENET Vision 1.5 Transient Module– bubbly flow

Slug	

PIPENET Vision 1.5 Transient Module– slug flow

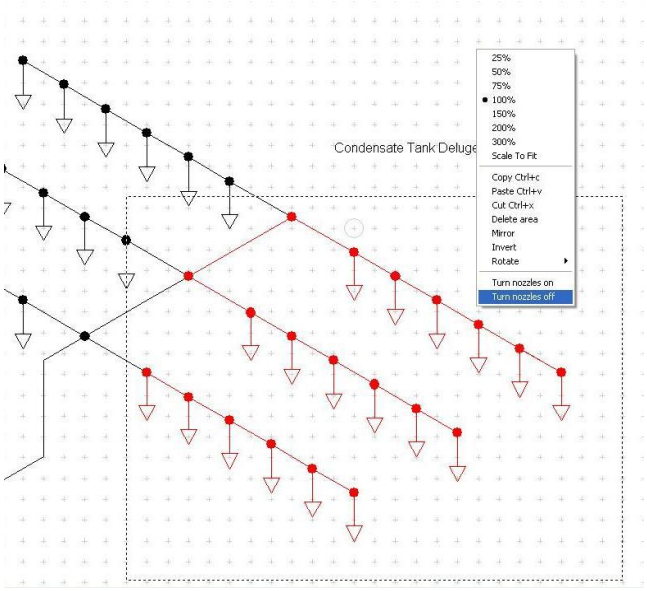
Stratified	

PIPENET Vision 1.5 Transient Module– Stratified flow

New Features in PIPENET Vision 1.5 Spray/Sprinkler Module – Turning nozzles on and off

In the In the Spray/Sprinkler module, customers asked for a quick way to turn a group of nozzles on or off to simulate different operational scenarios that might occur. Using an area selection tool it is now easy to turn all of the selected nozzles on or off.

1) Use an area selection tool to select the nozzles
2) Click the right mouse button
3) A new option to turn all of the selected nozzles on or off appears



***PIPENET** Vision 1.5 Spray/Sprinkler Module – Turning nozzles on and off*

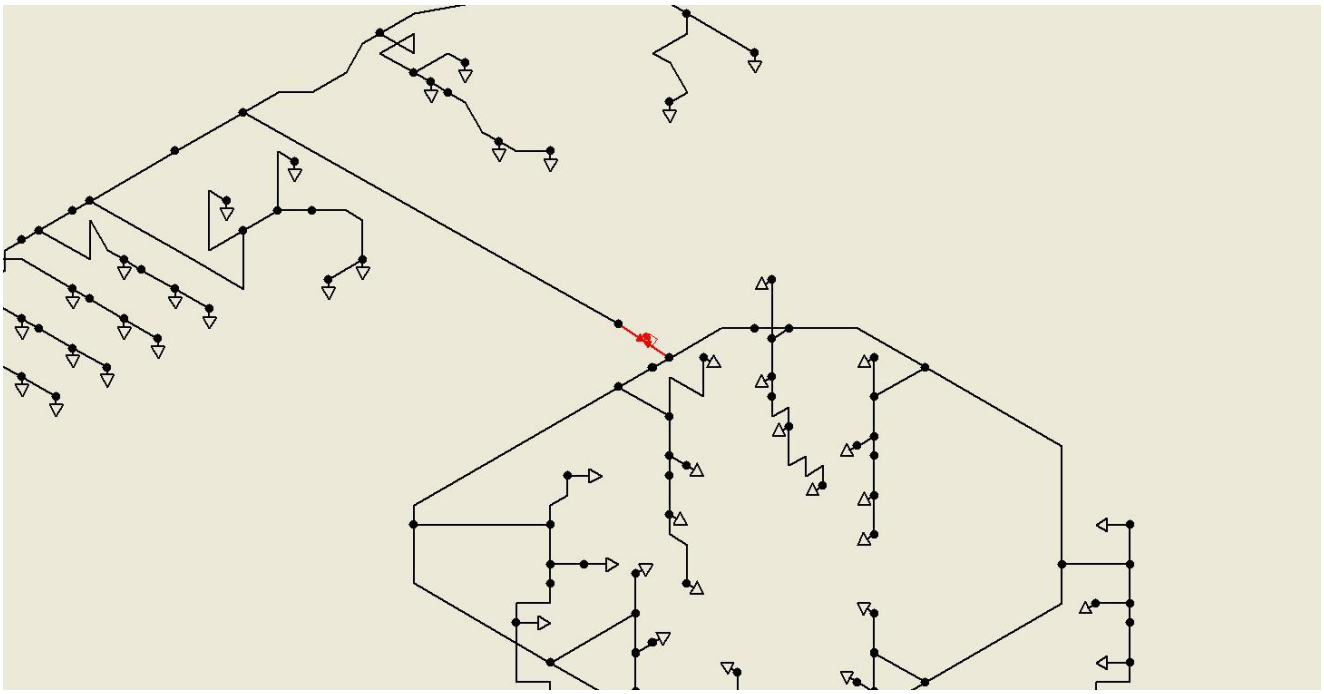
New Features in PIPENET Vision 1.5 Spray/Sprinkler & Standard Modules - Elastomeric Valves

This new valve enables the user to achieve the required input pressure, output pressure, pressure drop or flow rate without the need to input the valve characteristic data. It has been developed in response to the following user needs:

- Some operating companies need to look at the simulation from both design and operating aspects. They need this new valve to join the ringmain system and deluge system together.
- Some users might only have the target/design input pressure, output pressure, pressure drop or flow rate, but not all the valve characteristic data.

It is called ñelastomeric valveò because elastomeric valve is a representative type of valve with the above roles; however, it could be used to model any valve with a similar functionality.

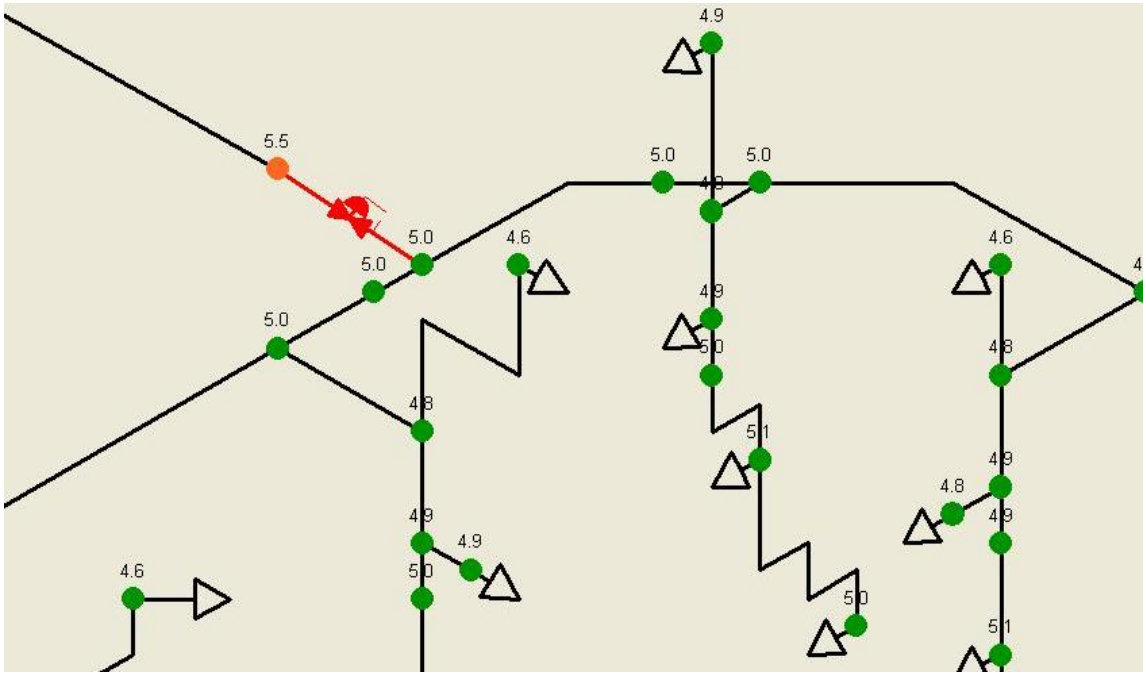
The example below shows a section from a large network in which an elastomeric valve has been used to control the pressure into a deluge system sub-network (the valve is highlighted in red)



Here (right) are the properties of the valve after analysis has been carried out, showing that the user has specified an output pressure for the valve which has been honoured in the modelling, while the input pressure and flow rate have been calculated:

The schematic, shows the effect on node pressures in the vicinity of the elastomeric valve (the numbers shown are pressures in Bar G):

Label	1	
Input node	12	
Output node	14	
Type	Output pressure	
Target value	5	Bar G
Results		
Input pressure	5.489875	Bar G
Output pressure	5	Bar G
Pressure drop	0.489875	Bar
Flow rate	3111.901356	l/min



PIPENET in Nepal

Trek Nepal was a fund raising trek through the Annapurna Mountain range without any luxuries - such as a shower - to raise money for disadvantaged children and adults to enjoy a range of musical experience and education. Peter completed the trek in March and raised a significant sum for this musical charity.

"Last week I was in Nepal trekking in the Annapurna region. This was in part due to your generous donation to Classic FM's Music Makers charity. I also had to get fit for the walking and climbing up and down rough steps that were involved. We lived simply in tents but were well supported.

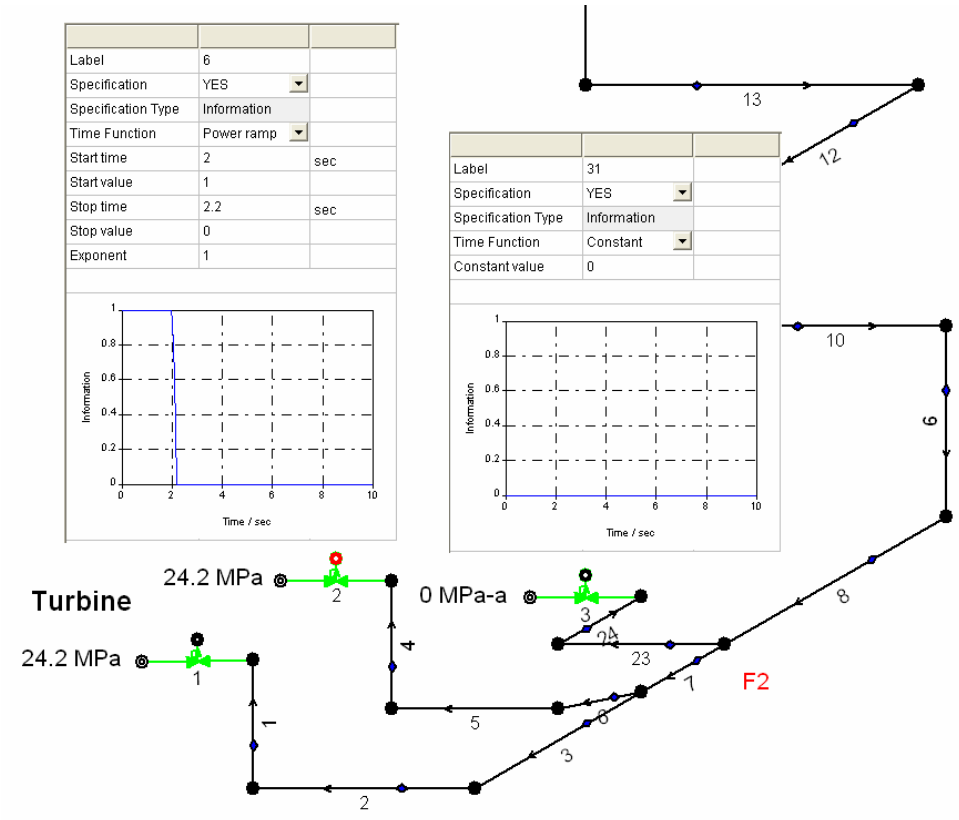
It was a great experience for us seeing all the beautiful but varied scenery and meeting friendly locals. The sunrise from the Tara Hill Top camp (2800 m above sea level) was particularly memorable. Nepal is rich in water resources: it's wonderfully clear in the mountains and seems to be piped to every village. At one village, the locals visited our camp and performed local songs and dances for us, giving us a formal welcome."

PIPENET Transient Module

New ‘Steam Hammer’ chapter in the PIPENET Transient module Training Manual

Besides accurately predicting liquid flow, PIPENET Transient module can also properly model the steam hammer and further estimate the magnitude of dynamic forces in the pipeline. The steam hammer normally happens when one or more valves suddenly close or open. In a power plant, the steam hammer could be an inevitable phenomenon during turbine trip because many relative valves (e.g., main steam valves) must be closed very quickly to protect the turbine from further damage.

In this new chapter, the steam hammer in the scenario of a turbine trip is modelled and analyzed. We also discuss the dynamic force and the approach measure for boiler and safety/by-pass valves. It is a ómust readô for engineers facing the problems caused by steam hammer.



This chapter considers fluid properties, pipe types, valves, boundary conditions, turbine trip with by-pass valve closure and turbine trip with by-pass valve opening. It also gives a full explanation of how to calculate valve factor and how to calculate Cv (Kv). There is also information on the PIPENET Interface.

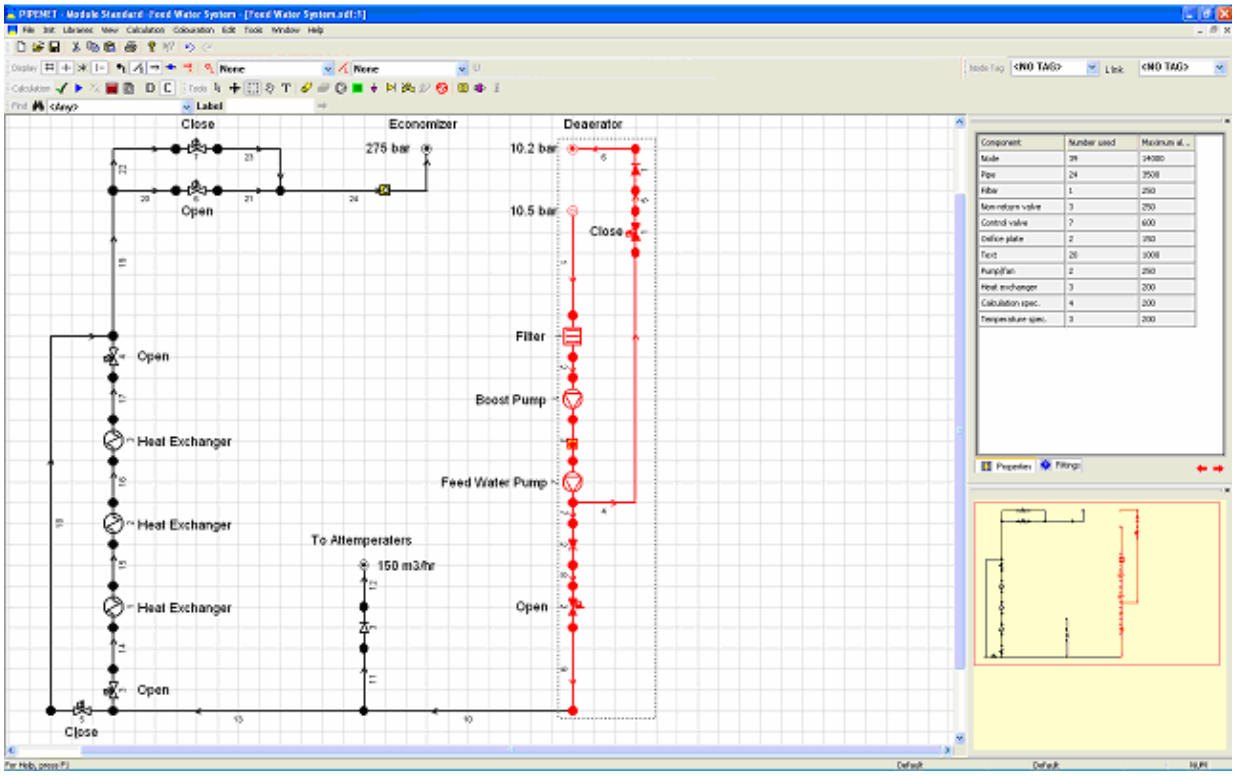
PIPENET Standard Module – In the Power Industry - ‘Feed Water System’

New Power Industry chapter in the PIPENET Standard module Training Manual

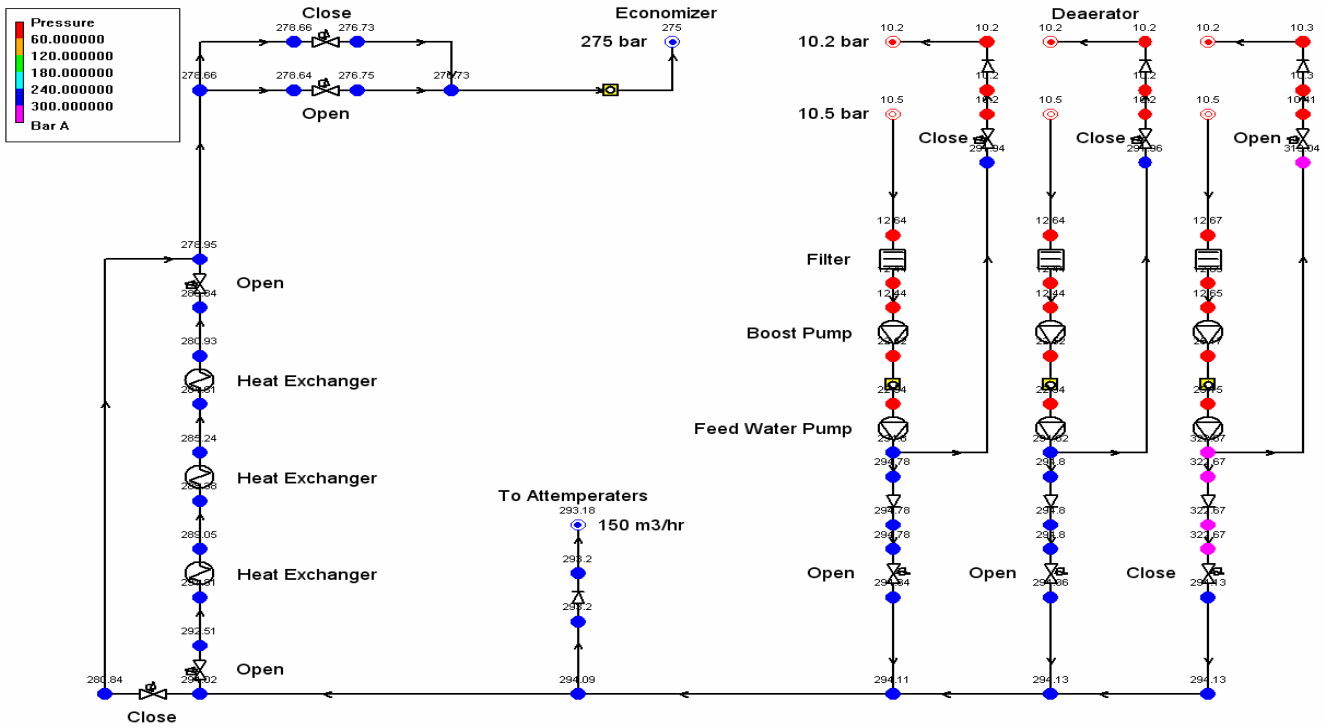
PIPENET Standard module is widely used in the power industry. Some typical applications include:

- Main/reheat steam systems
- Condensate/feed water systems
- Cooling water systems
- Steam distribution systems
- Fuel oil systems
- Ventilation systems

- Compressed air systems



Pressure results

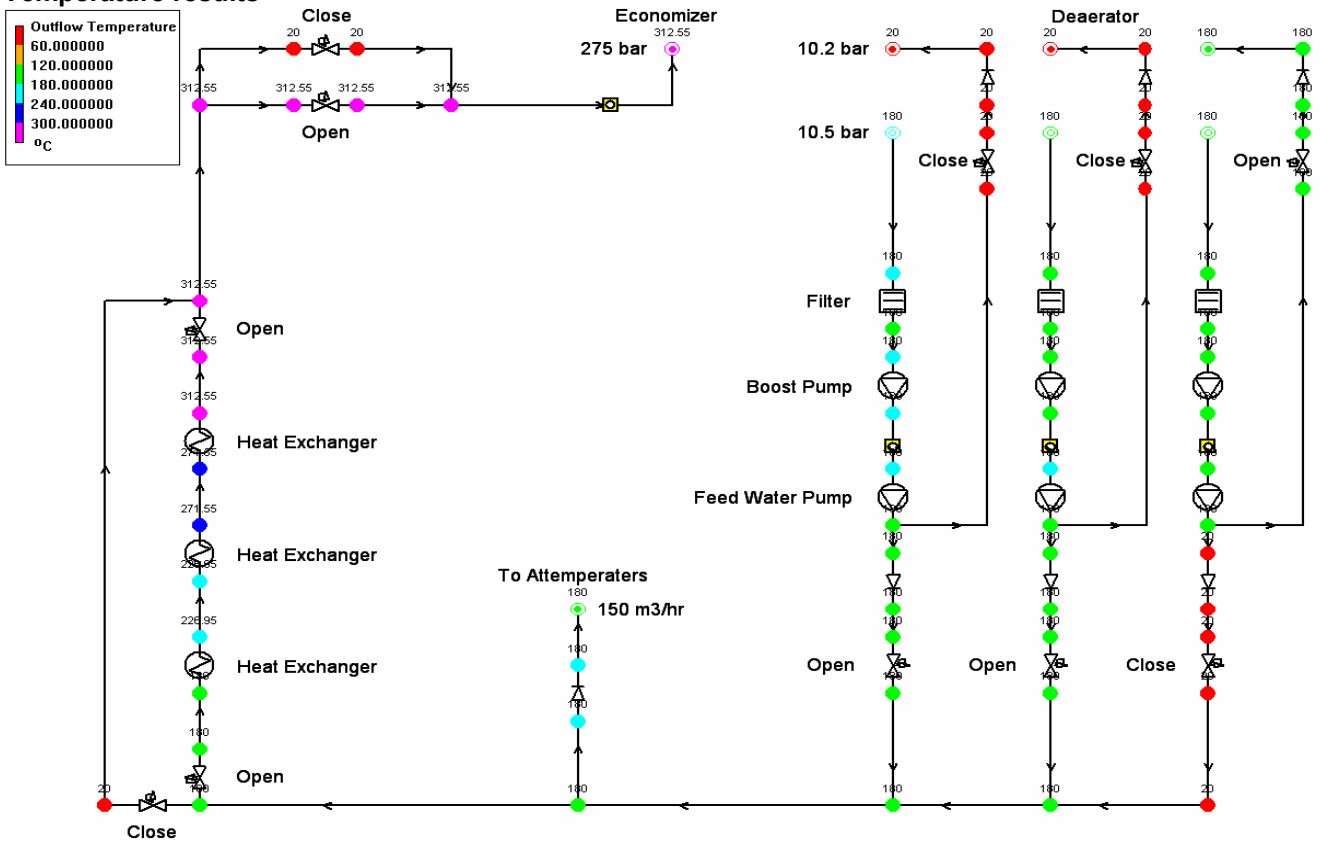


In this new power Industry chapter in the PIPENET Standard module Training Manual chapter a feed water system is modelled and analyzed:

- To demonstrate how to model a filter using PIPENET
- To demonstrate how to model a pump using PIPENET
- To demonstrate how to use heat transfer mode and model a heat exchanger using PIPENET
- To demonstrate how to add a orifice plate using PIPENET

- To demonstrate how to model a bypass line using PIPENET

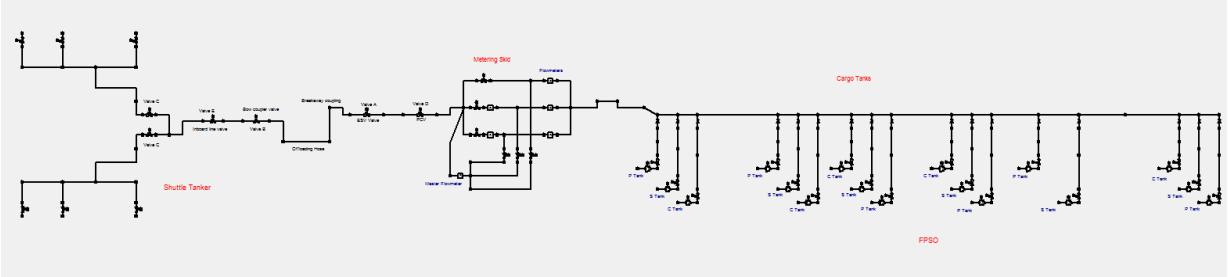
Temperature results



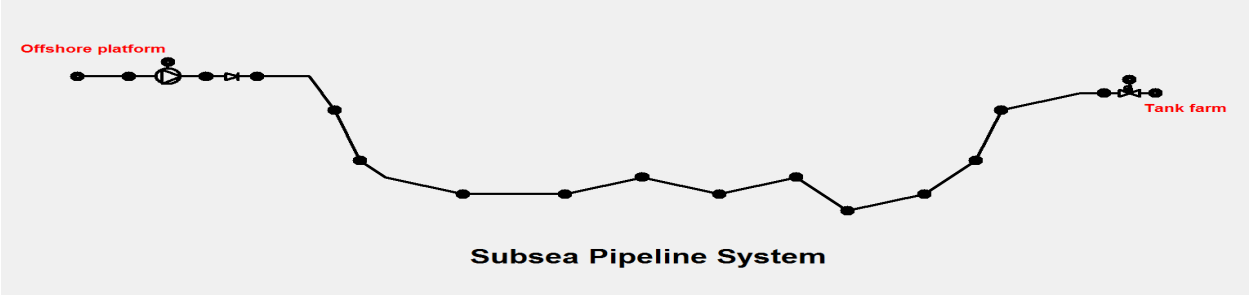
If you would like to download the latest version of the PIPENET Training Manual, please contact us, emailing pipenet@sunrise-sys.com We look forward to hearing from you.

PIPENET Transient Module- Leads the way in hydrocarbon pipeline applications

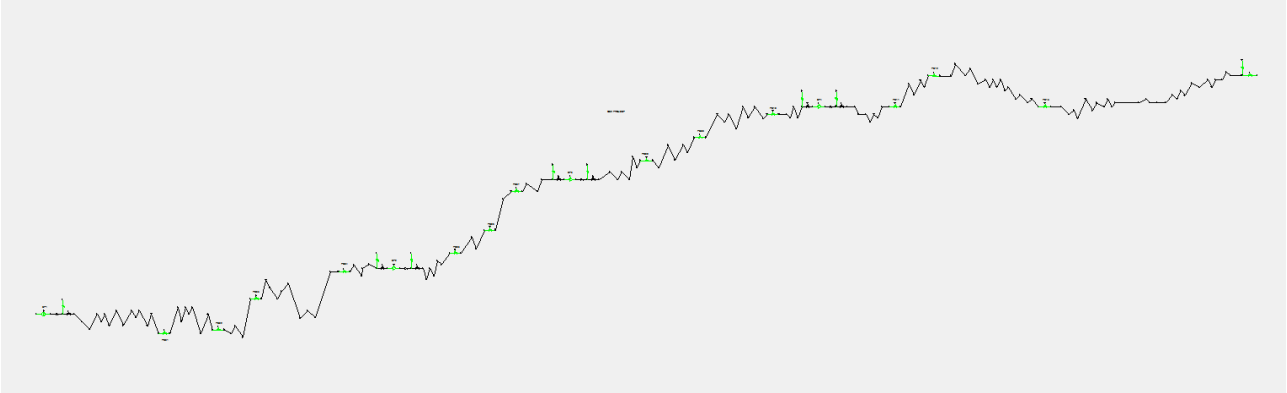
1. CRUDE OIL TRANSFER LINE:



2. SUBSEA CRUDE OIL PIPELINE



CRUDE OIL PIPELINE



PIPENET Vision 1.5 New Demonstrations

We have a range of new PIPENET Demonstrations covering each module of PIPENET. There is a 'Quick Demonstration that lasts less than a few minutes and a longer, more comprehensive demonstration for those who would like a more detailed introduction to PIPENET. If you would like to view the new demonstration, please contact us, by emailing pipenet@sunrise-sys.com Alternatively, the PIPENET demonstrations, Training Manual and User Manuals are all included on the PIPENET Vision 1.5 program cd.

PIPENET Maintenance Updates and Support Subscription

For a small annual subscription you can ensure that you are always working with the latest version of **PIPENET,** as well as being assured of assistance from our support. Email sales@sunrise-sys.com for more information. **PIPENET Vision 1.5** is being sent to all customers with a valid Maintenance, Updates and Support contract.

PIPENET Customer Feedback Please let us know what additional features you would like to enjoy in future versions of **PIPENET.** We value customer feedback and comments highly, so we will be very pleased to hear from you. Please give us your comments via the 'Contact Us' page of our website www.sunrise-sys.com**.**

PIPENET NEWS

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