Fluid
Scandinavia

– Det känns väldigt stimulerande att inte bara vara en anställd VD utan att också äga en del av företaget. Det ger en speciell drivkraft, säger Krister Johansson på Tubex AB

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Hydraulik från Enerpac möjliggjorde "Fågelboet" på Olympiastadion i Beijing

X-Block ® is a way to reduce energy consumption in pneumatic systems

In Fluid Scandinavia nr 3, 1996, there was an article on “a cylinder saver” developed by the Company Pos-Line. The main idea with the cylinder saver was to re-use the compressed air released into the atmosphere on the working stroke as a spring to return the stroke back into its start position without the use of new air. Tests proved that it was possible to reduce air consumption by more than 50%. For different reasons the cylinder saver did not work as envisioned and never got out on the market. Among the reasons for its failure was that it did not work with standard cylinders, something the market could not accept.

Thomas Hallberg (on the left) and Per-Åke Wahlberg next to the packing machine where X-block serves a total of 45 cylinders.

Per-Åke Wahlberg, the inventor and technical engineer from Harads in Norrbotten, Sweden and Production Manager at Pos-Line in 1996, produced some 7 different cylinder sizes and over 400 cylinders using this technique. In the meanwhile, in 2002 Pos-Line went bankrupt with 50 of the cylinder savers sold in the last phase.

From Pos-Line to X-Design AB
Per-Åke established his own company, X-Design AB, with the objective to develop further the concept and bring it to market. A patent was filed and approved by the Swedish patent office and the trademark X-Block® was created, which has resulted in large interest both in Sweden and abroad. An international patent filing is also underway.
The big difference between the earlier concept and that of Per-Åke is the separation of the “energy saving mechanism” from the cylinder. This way a Company can continue using its own cylinders and pneumatic configurations without needing to make significant changes with an energy saving add-on. In addition, X-block® can be used with many cylinders.
Several X-blocks have been installed at SCA´s sawmill in Munksund and the change over from a standard pneumatic system to an X-Block based system continues with average air savings of over 60% in those applications with X-block. This does not include savings from leakage repair and shifting out of defective components. Including these improvements, air consumption drops by over 90%. This represents a large energy award and large expense savings considering that there are three 90 kW-compressors running all day long. Per-Åke believes that if one big compressor takes out, and a number of smaller compressors will be plased at the production units that will lower the electricity cost, because the cost is high to keep pressure up to system pressure all the time.
In any case it is highly unlikely that SCA needs 3 x 90 kW when the present compressors “go on pension” and are replaced with new ones.

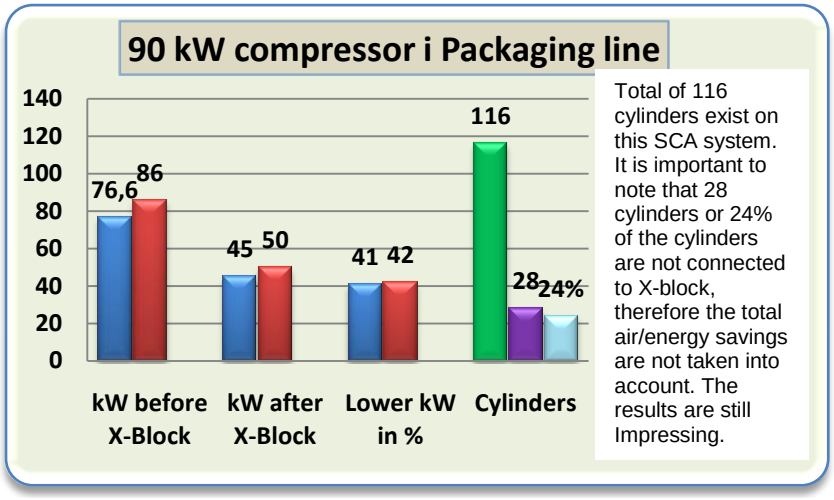
X-block has provided large energy savings at SCA in Munksund
Together with Per-Åke we visit SCA´s sawmill in Munksund just outside Piteå for a closer look at the installations and to hear what the operations and maintenance personnel say about the X-block.
Thomas Hallberg, maintenance manager at the saw mill, has only good things to say about the X-block since the day Per-Åke enetered the Company in 2006 and presented the system. With device in hand, things were set in motion, which according to Thomas not only provided large energy savings, but additional synergy effects in the form of higher productivity, smoother and softer strokes,fewer changes of components, less maintenance, fewer operation interrupttions, etc. In short, it resulted in a more effective and cheaper production and an improved environment due to less noise.

Here X-Block is shown (in the middle of picture) not taking much space but produces so much more. Here it is installed on a stacking machine.

Several ”psychological problems” exist according to Thomas, so education is needed. Operations personnel are used to pneumatics knocking and making noises in a certain way hence one can only get so far with Per-Ake’s X-Block installation. Per-Ake has no interest to just install X-Block and turn and leave. He has put a lot of pain into optimizing the installations at Munksund. He insists on a total solution and that X-Block is not installed before leaks are repairs, defective components repaired, etc, measurements are made before and after X-Block installations before one determines the difference.

At home at Per-Åke in Harads, where he has his office and work area. We look at the measurement data done at SCA to analyze the effects before and after installation of X-block.

Per-Åke has even made a testing model to among other things to check to ensure that the system does indeed work.
The test system consists of two cylinders, the one to the left connected to a 5/2-valve with a back valve and a standard configuration. The cylinder on the right works with a 3/2-valve where new air is not needed for return stroke. A tank volume of 0,6 l is connected to the negative side and also connected to the X-Block. A back valve on the negative side is not required. Both set-ups can be tested with or without a 3 kg load.



Picture shows parts of Per-Åke's testing system close up. The testing system consists of a compressor, tubing, computer with a special program for measurements and in the background the testing set-up. In his hand Per-Åke has a slightly larger X-block than that installed at SCA. This Block has been especially designed for a customer in the USA.

While running at 6 bar and a 3 kg load the air consumption is 0,55 liter/min in the standard set-up at speeds of 30 cycles/min. Running the X-Block connected system requires an air consumption of 0,24 liter/min, in other words 56% lower air consumption. Per-Åke also shows that by running the air compression at a constant 6 bar on both the conventional and X-Block systems that one can also obtain substntially faster speeds. Up to 170 cycles/min can be obtained using the X-Block system.

Where do you go from here to take advantage of these possibilities?

What does the situation look like for Per-Åke today?

His company X-Design AB is a company with himself and an international investor who owns today 35% of the company. With the thought that there is positive interest from the market both in Sweden and abroad, is it clear he needs economic help to market and sell X-Block. It has been a long period from the development of X-block until now, especially difficult for Per-Åke. Initially when the company started he got a loan from ALMI, but when the patent needed to be paid it got difficult again. The assistance he has received in various forms such as royalty-loans, the majority from the Energy Department and IUC (Industrial Development Center), but also from Landstinget, Innovation Norrbotten have been especially gratifying. Despite progress with SCA and other companies, the activities up until now have not been profitable.

Order from USA

The saw mill in Munksund is an excellent reference for Per-Åke and he can count on new contracts from SCA Timber AB, Jämtlamell in Stugun and several projects from SCA's other facilities. He has also just got an order from an American air audit firm. The project consists of a specially designed X-Block with a company with 165 factories in North America. The air audit firm is interested in helping its customers save energy and increase productivity.

X-Block in 12 factories in England

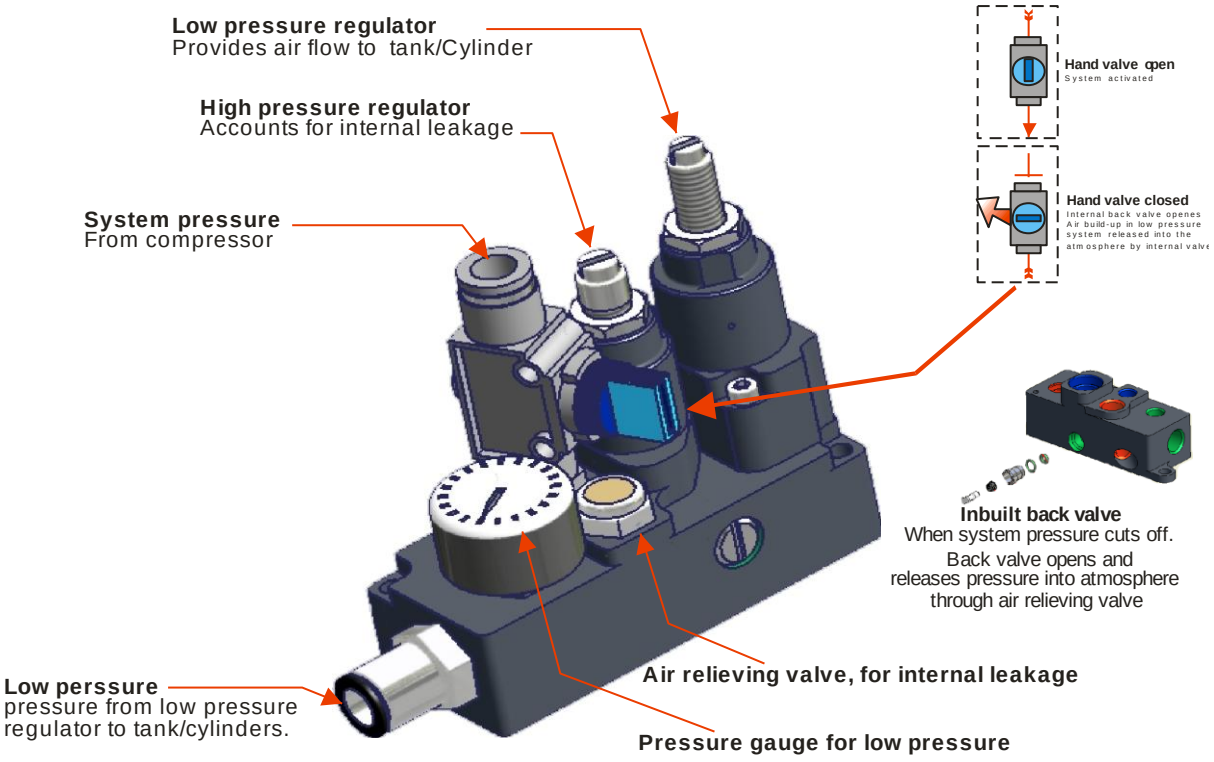
In England, through a distributor X-block is installed in 12 large factories, and is trying to get approval from the Carbon Trust as an energy saving device. Carbon Trust is the near equivalent of the Department of Energy in Sweden, who Per-Åke hopes will approve the device thereby benefiting market efforts in England. He also believes the SCA reference will help put a foot in the large American market. Per-Åke as a small comapny has had problems getting economic support from the home market even though the X-Block system is proving to have great possibilities on the world market.

A potential of 35 million units, forecasts Per-Åke

In 2007 Per-Åke Wahlberg won first prize in the Venture Cup Nord competition and took 3rd place in the finals in Sweden with the energy saving device X-Block®. This was helped by available statistics showing a potential need for 35 million units for the European and North American markets. The market value should be possibly at least 300 billion kroner only for the components thereafter comes installations, measuring, and consulting. In Sweden alone, Per-Ake believes at least one power plant can be saved/eliminated if all the pneumatic systems used the X-Block system. Energy usage could drop 40 – 90% if the manufacturing facilities used the system.

Article written in Sweden by Lars Dahlfors
Translated by John Dennis

X-Block®



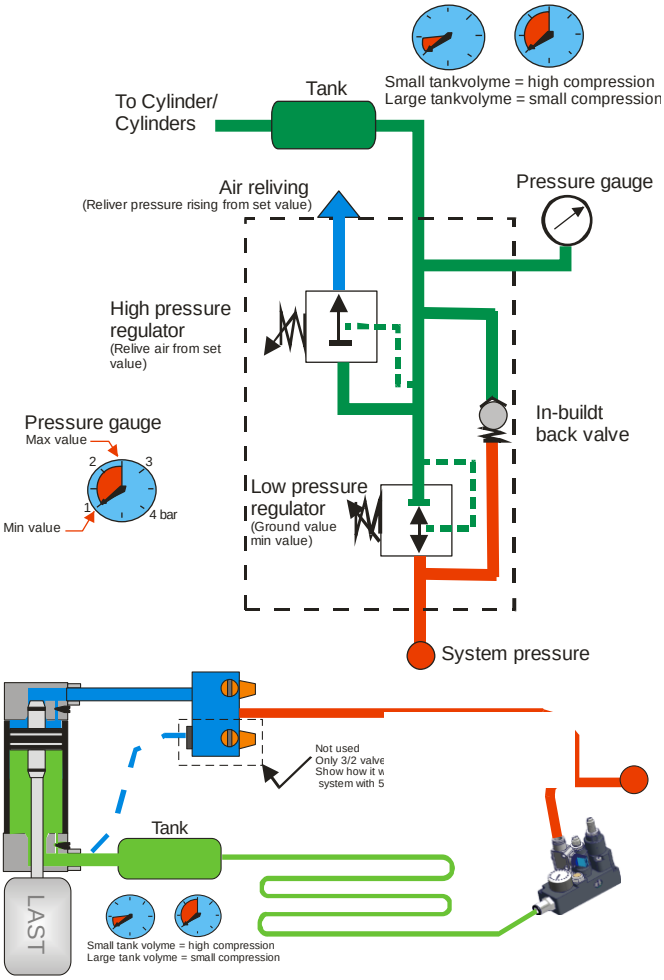
This is how X-Block® works

In most pneumatic systems the cylinders' power requirements are over dimensioned. It does the work stroke (plus side) and also builds up pressure on the minus side. The minus stroke can work with or without a load by using this power. This is the concept behind X-Block to save air. Connecting X-block involves no external air to move the cylinder's minus side.

Figure 1 shows how X-block looks. The functioning of the system is shown in Figure 2 and 3. The low pressure regulator controls the level of pressure so that the cylinders work as desired. . Under the plus side, air is compressed and confined in the tubing between X-Block and the cylinders and on the minus side, the air is confined and used to push the return stroke. The purpose of the high pressure regulator, which is a pressure stop valve, is to prevent too high a pressure build-up on the cylinders' minus side, which develops from air leakage between the cylinders' chambers, for example, when cylinders over a longer time are in the positive position with full pressure from the negative side.

With an emergency stop air is released on the negative side by way of an inbuilt back valve.

So that the air flow is sufficient a tank is usually installed between the cylinder and X-block. Normally a volume of three times the cylinder volume is recommended. One X-Block can be connected to more than one cylinder. When cylinders move at different intervals, the volume of the cylinders that are in the negative side position can also serve as a means of storing additional, thereby adding to storage capacity.



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