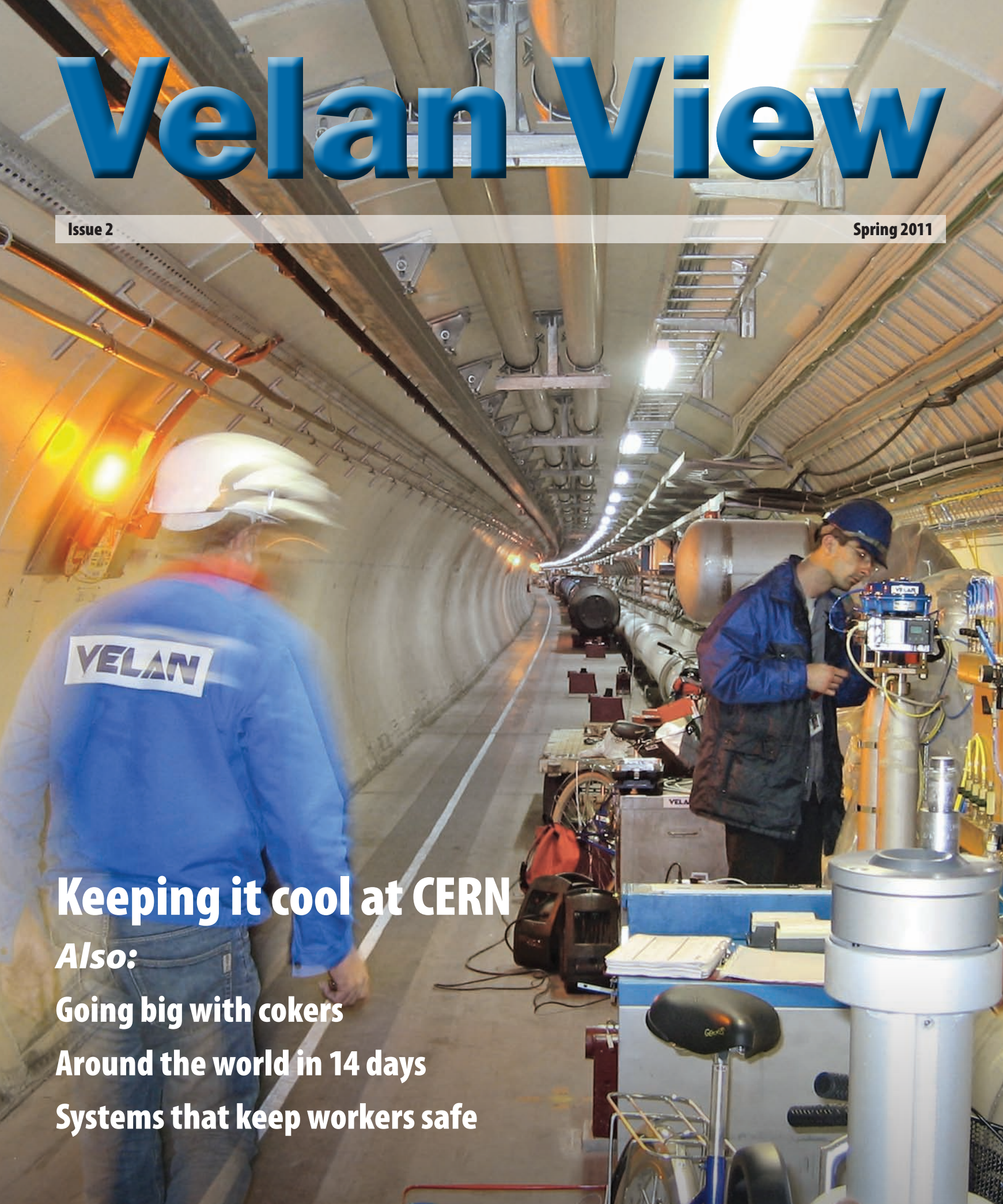
Velan View

Issue 2 Spring 2011



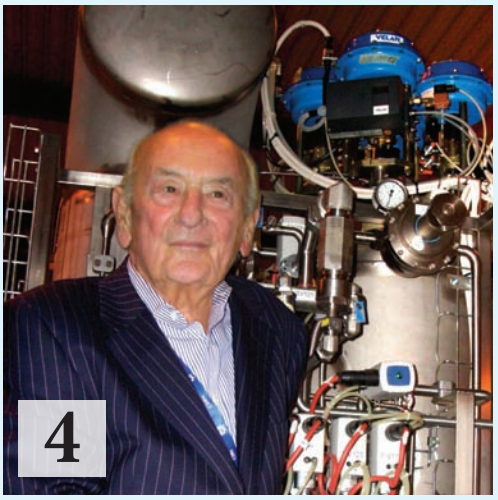
Keeping it cool at CERN

Also:

Going big with cokers

Around the world in 14 days

Systems that keep workers safe



4 **Keeping it cool**

Velan's valves are part of one of the largest machines ever built—the CERN Large Hadron Collider on the Swiss/French border, where scientists are exploring some of the most fundamental questions of physics. The testing conducted there presents challenges valves have never before experienced, from some of the lowest temperatures in the universe to unimaginable speeds.

12 **Building a strong relationship in Brazil**

Distributor Fittinox-Feital has created a broad market for Velan valves in a country that provides tremendous opportunity. *Velan View* explores how this successful partnership began and where it's headed.

15 **A conversation with Peter Gerster**

Talking with one of Velan's long-term representatives provides a glimpse into the teamwork that helps ensure projects are successful.

18 **Around the world in 14 days**

Velan's employees are often called upon to travel to many places in pursuit of new business, to learn about new challenges in end-user industries, and to keep our customers happy. This team traveled across the globe and came back with lessons in all three areas.

23 **Creating systems that keep workers safer**

Velan produces more than metal parts, and nowhere is that more evident than in the area of control systems. To create these complicated systems takes a deep level of expertise.

26 **A day in the life of a busy executive**

Going forward, *Velan View* will talk to a broad range of employees who help with the day-to-day operations of the company. A good place to begin is with the Executive V.P. of Operations, Stephen Cherlet.

29 **The annual valve shipments forecast from VMA**

Valve shipments out of U.S. facilities will rise in 2011.

30 **Going big with cokers**

One of the many industries within petroleum and refining that keep Velan's R&D teams on their toes is the delayed coking process. One example is the giant severe service valves designed in partnership with Chiyoda for a new refinery in Saudi Arabia.

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President's message:

Good news from the front lines

These are very trying times around the world and every day we're bombarded with messages of doom and gloom, of major political conflicts and devastating natural disasters. It's at times like this that we need to be reminded that there are good people doing good things, both within our own personal spheres of influence and in the world at large. That's exactly with this magazine is designed to do: Celebrate the achievements of people within our company, our distribution base, and our industry in general. Share the stories of smart people doing cool things.

We're glad to have the opportunity to share these stories with you, and we're already hard at work on the next issue.

In this spirit, we begin this issue with an overview of the CERN Large Hadron Collider in Switzerland where scientists are exploring some of the most fundamental questions of physics. This massive experiment is truly a first for mankind, and it's already producing some unique views into what happened during the creation of our universe.

As you look through this issue, you'll find stories on producing the world's largest coker ball valves, and forging strong business relationships with a growing Brazilian Velan distributor, Fittinox-Feital. We present the forecast for valve shipments in 2011 based on research conducted by the Association of America (VMA). We also explore the challenges of global travel in "Around the world in 14 days."

I'm sure you will enjoy the profile of Victory Sourcing's Peter Gerster, a Velan representative for almost 25 years. In this interview, we discover how Peter took a circuitous route toward working with industrial valves through carpentry, advertising, and remarkably casting his nets as a bay scalloper on Nantucket Island. Fishermen and valve salesmen can share a mutual understanding for stories about "the big one that got away!"

We're glad to have the opportunity to share these stories with you, and we're already hard at work on the next issue.

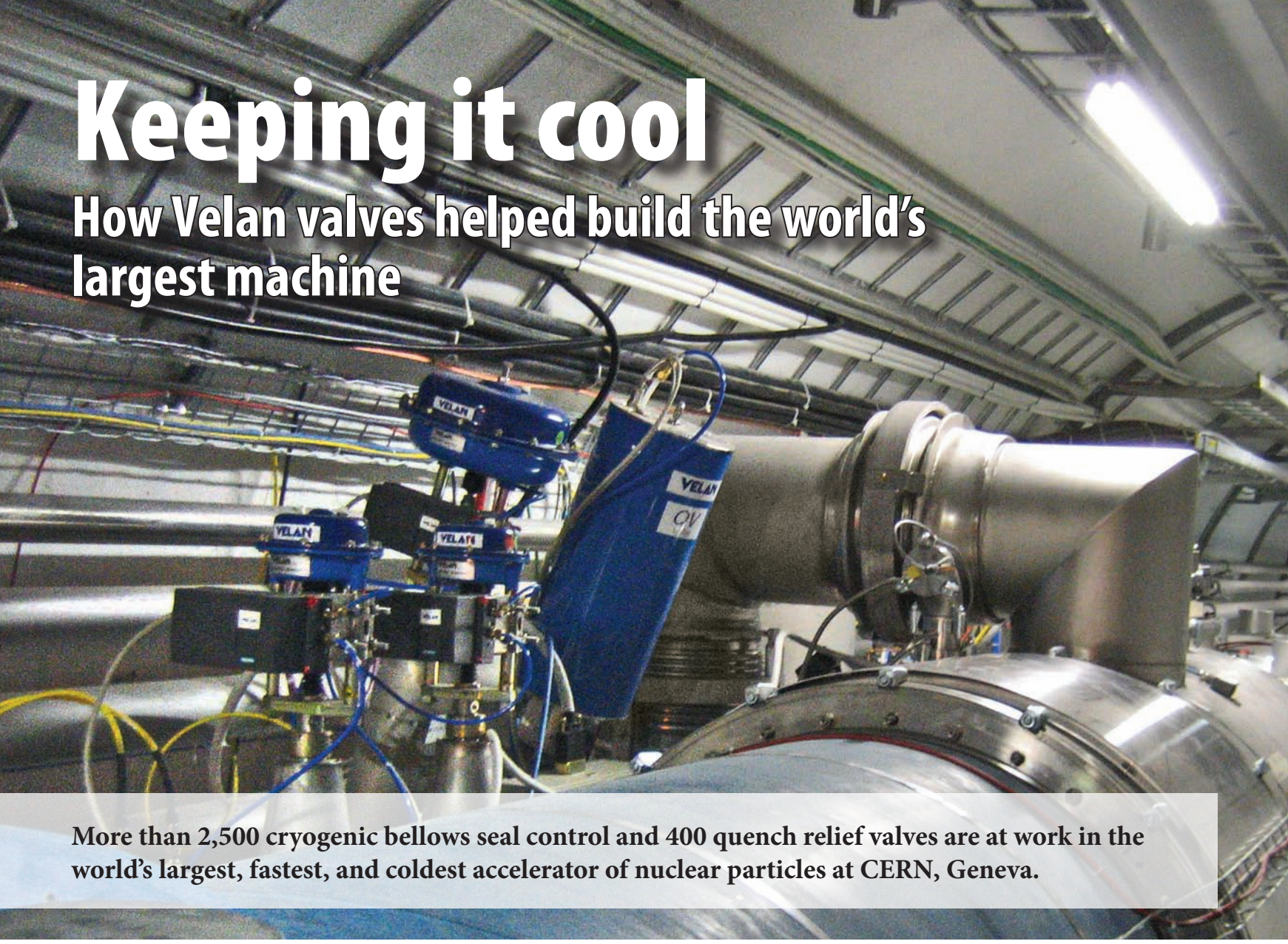
If you have any of your own stories you want to share with your peers in the industry, give us a call or drop us a line: we'd love to hear from you. Also, if you have any good photos of Velan valves in service, we would put them to good use in future publications.

Hope you find this publication interesting and useful.

Tom Velan

Keeping it cool

How Velan valves helped build the world's largest machine



More than 2,500 cryogenic bellows seal control and 400 quench relief valves are at work in the world's largest, fastest, and coldest accelerator of nuclear particles at CERN, Geneva.

Over Velan's more than 60 years in business, the company has been involved in some ground-breaking projects. For example, in the early '50s, we helped launch nuclear-powered submarines for the U.S. Navy—the beginning of a new age in power generation. However, it's pretty hard to top participating in the CERN Large Hadron Collider (LHC) experiment being conducted in a tunnel 27 km (17 miles) in circumference, buried 50 to 150 meters (164 to 328 feet) below ground.

Located between the Jura mountain range in France and Lake Geneva in Switzerland, the tunnel houses the LHC—a mind-boggglingly expensive and massive machine for concentrating energy into a very small space. The scientists who operate the LHC hope to address some of the most fundamental questions of physics, which will advance understanding of the laws of nature.

Velan's involvement with CERN

In addition to being an inventor and Velan's founder, A.K. Velan has long been an ardent cosmologist. In fact, he's written a couple of books on his theory of how life as we know it began, the latest of which is titled: *"Birth and history of the cosmos."* To say he was proud to have Velan valves selected to help control the superfluid liquid helium that cool the magnets in the CERN LHC would be an understatement.

The LHC uses 1,700 superconducting electromagnets cooled by 700,000 liters of liquid helium to guide and push protons in a very tight beam over many millions of laps inside the tunnel loop. To control the superfluid helium, 2,500 cryogenic valves and 400 quench relief valves are installed inside the tunnel at various locations in the cryogenic lines and around the two super-giant helium liquefiers.

The LHC cryogenics system is hugely complex, and the liquid helium passes through more than 40,000 pipe junctions. Velan installed vacuum-insulation jacketed bellows seal control valves as well as bellows seal jacketed double shell valves along the accelerator lines that run the tunnel length to


Photo credit: CERN

control the helium flow and provide vacuum insulation against the -271°C (-456°F) liquid helium. These valves also protect some of the cryogenic lines and the superfluid helium enclosures of superconducting magnets against over-pressure resulting from changes in electrical resistance—otherwise known as "quench."

Back to the future: The search for the Higgs boson

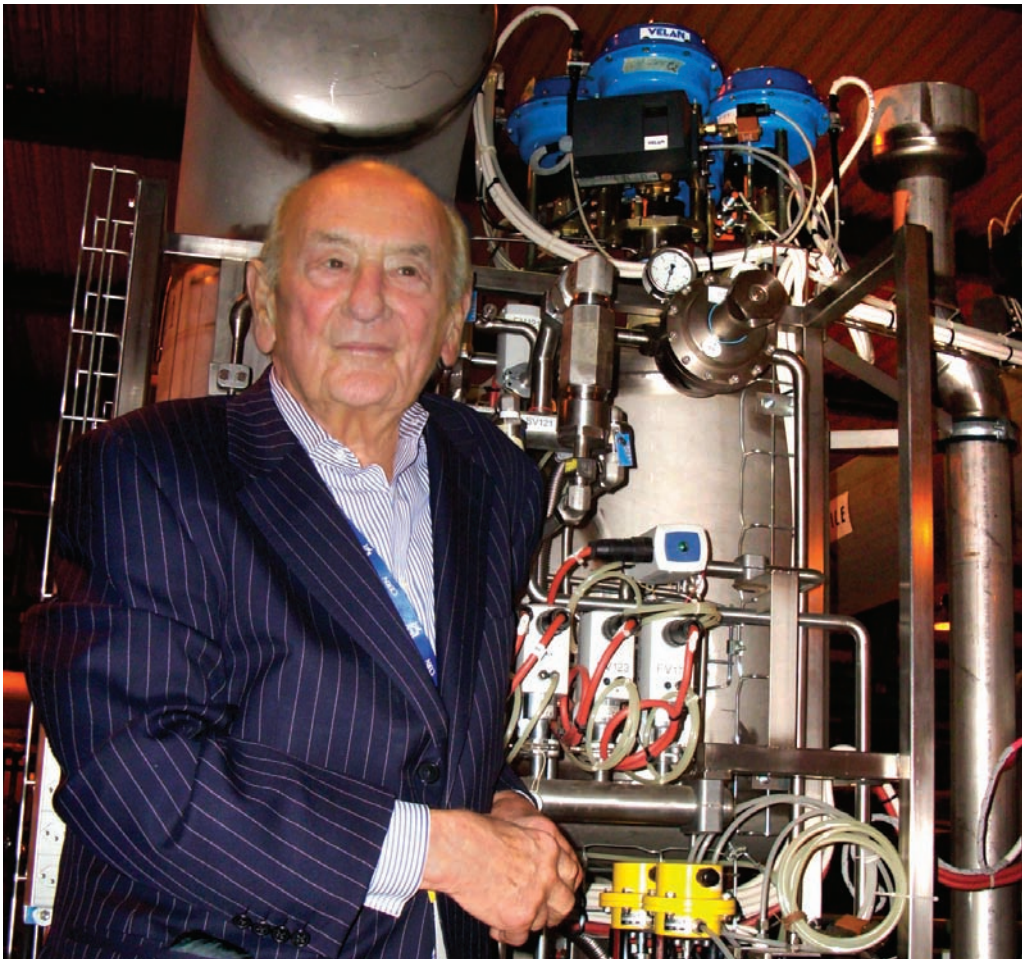
Many question why CERN scientists are doing what they do. The short answer is that they are looking for evidence of the Higgs boson—also called the "God particle" since it is believed to imbue all other particles with their mass. This is the last remaining elusive particle needed to bring Einstein's famous general theory of relativity into a theoretical model called the Standard Model of particle physics. Doing so would give the world a framework for understanding the fundamental particles and forces of nature.

Blast from the past

If you think about it, the LHC may just be the closest thing on earth to a time machine. After all, the conditions that it creates as particles explode inside its reactors, releasing tremendous energy, have not been seen since a trillionth of a second after the Big Bang started our universe 13.7 billion years ago.

During those first few moments, the universe was an immensely dense and hot "soup" of particles. It was also very simple: only one force existed for the equal amounts of matter and anti-matter. Next, the gravitational force separated from that one basic force and took on its own form as the universe cooled down while a second, strong nuclear force appeared. Then, the final separation of forces happened, which released a weak nuclear force (such as that responsible for nuclear reactions) and an electro-magnetic force. This is when the Higgs boson is supposed to

> ***"We are not just manufacturers of cryogenic valves but we also share, with the 10,000 scientists working for CERN, their passion for cosmology and discovering more details about the birth of the cosmos."***
>
> **— A.K. Velan**



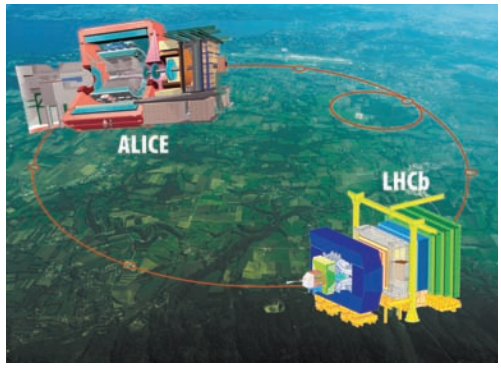
A.K. Velan standing next to some of the many Velan valves installed at CERN.

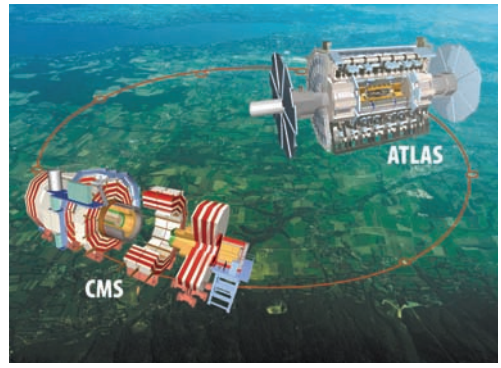
have given other particles mass—something that the experiments at CERN are designed to prove.

CERN scientists are using this time machine so that they can "travel" back to the very distant past to propel our world into the future.

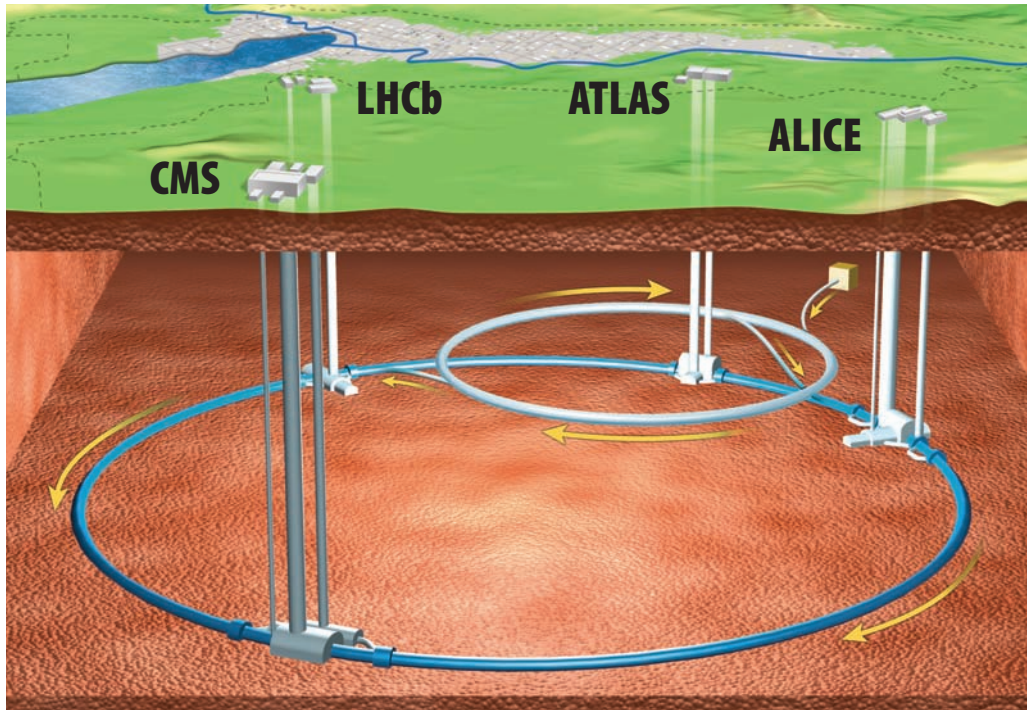
"Nature is often more elegant and more intelligent than human beings…We learn about the beauty of nature and its intelligence in creating unexpectedly elegant and meaningful results beyond anyone's expectations."

—Fabiola Gianotti, head of the CERN ATLAS group[1]





Images by CERN



This computer-generated image shows the location of the 27-kilometer (17-mile) LHC tunnel (in blue) on the Swiss-French border. The four main experiments (CMS, LHCb, ATLAS, and ALICE) are located in underground caverns connected to the surface by 50–150 meter (169–328 foot) pits.

Four powerful detectors

The LHC particle accelerator is equipped with four detectors: ALICE, LHCb, ATLAS, and CMS. In these detectors, opposing beams of particles come together and the protons are smashed against each other, so there is only one channel inside each of the detecting electromagnets. The particles are sent to one of the four detectors at specific times after they have been accelerated. Here's a few elemental facts that help to clarify the picture:

ALICE only operates one month a year, when the LHC is emptied of protons and, instead of proton acceleration, focuses on accelerating atoms of ionized lead. The reason is that these very heavy particles generate huge amounts of heat and create a "quark soup" of particles (a mixture of quarks and gluons) that existed during the first millionth of a second of the universe's life.

The **LHCb** (LHC beauty) detector is dedicated to finding the difference between matter and anti-matter by studying how quarks (thought to be the most basic particles and nicknamed "beauty" in the scientific community) disintegrate.

As its name suggests, the **ATLAS** (A Toroidal LHC Apparatus) detector is the main detector and does most of the heavy work for experiments and data collection. It is a huge magnet shaped like a giant donut with eight coils symmetrically placed like concentric circles around the central hollow where the protons crash. At its center is a giant ultra-rapid digital camera that emits electrical impulses when hit by a charged particle—enabling researchers to track those particles backward—like trying to find out a bullet's source location by seeing where it hit.

The **CMS** (Compact Muon Solenoid) detector has the same detection power as ATLAS.

The unexpected side benefits of pure science

The kind of collaborative research currently happening at CERN can have unimagined uses in our day-to-day lives. For example, understanding the laws of physics that affect radio waves has made it possible for us to develop radio, TV, cell phones, and aircraft navigation systems. What's more, the science of particle accelerators helped promote such important advances in medicine as CT and PET scans, and it is used to help destroy cancer cells. This growing list is proof that pure science can lead to concrete and pragmatic benefits for all mankind.

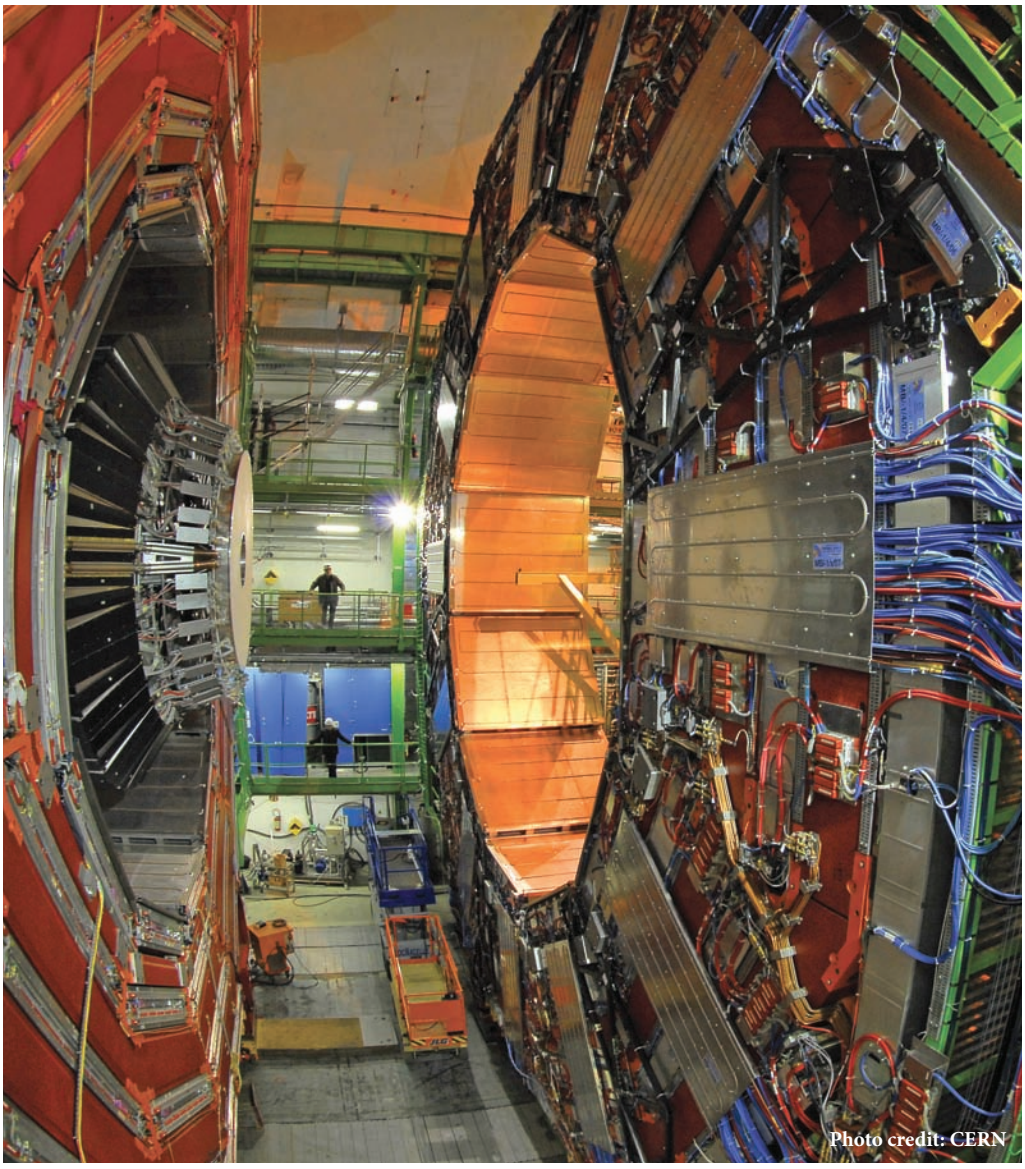
It is 21 meters (69 feet) long and 16 meters (52 feet) high, smaller but heavier than ATLAS. In fact, the CMS is the heaviest scientific instrument ever built and contains more metal than the Eiffel Tower!

The greatest feat of scientific collaboration ever

The working environment at CERN is so unusual in terms of the level of science and human knowledge that it has been studied by anthropologists, sociologists, and historians as a model of intelligent human interaction. Day-to-day life at what one journalist aptly rechristened "The Large Human Collider,"[2] means smart people rubbing shoulders and talking, and sharing results from their collaborative experimentation and analysis.

In the future, when we reflect on the discoveries made during this ground-breaking project, we may ask: What was the most significant achievement toward furthering mankind's existence on this planet? Perhaps the answer will be something beyond the strictly scientific results, something less measurable and more subtle. According to one CERN spokesperson: "The project is not only a scientific tour de force. It is a demonstration of how scientists and political leaders from many countries can cooperate to bring together unprecedented technological, financial, and human resources."[3] **|V V|**

Events recorded by the Alice experiment from the first lead ion collisions.



The CMS experiment's cavern in one of the LHC's four detectors.

Some fascinating facts about CERN and the LHC

- The coldest large-scale installation in the world.
- Magnetic field strengths are more than 200,000 times that of the Earth's magnetic field.
- Power consumption is that of a medium-sized city.
- Twin proton beams travel at 99.9999991% of the speed of light—which is 186,282.397 miles per second, or the same as going seven times around the world in a second.
- Protons make 11,245 turns around the 27 km (17 mile) circular track, travelling more than 10 billion km (6.2 billion miles) over 10 hours (equivalent to Neptune and back again).
- There are 17,000 superconducting magnets, each cooled to -271°C (-456° F) by liquid helium.
- The energy stored in the LHC's magnets is enough to melt 50 tonnes of copper.
- The number of scientists working with the LHC is more than 10,000.

Did you know?

The World Wide Web (www) was first invented at CERN in 1989 as a way of fostering communications within its own widespread community.

1 Amir D. Aczel, *"Present at the creation: The story of CERN and the Large Hadron Collider,"* 2010: 59-60.

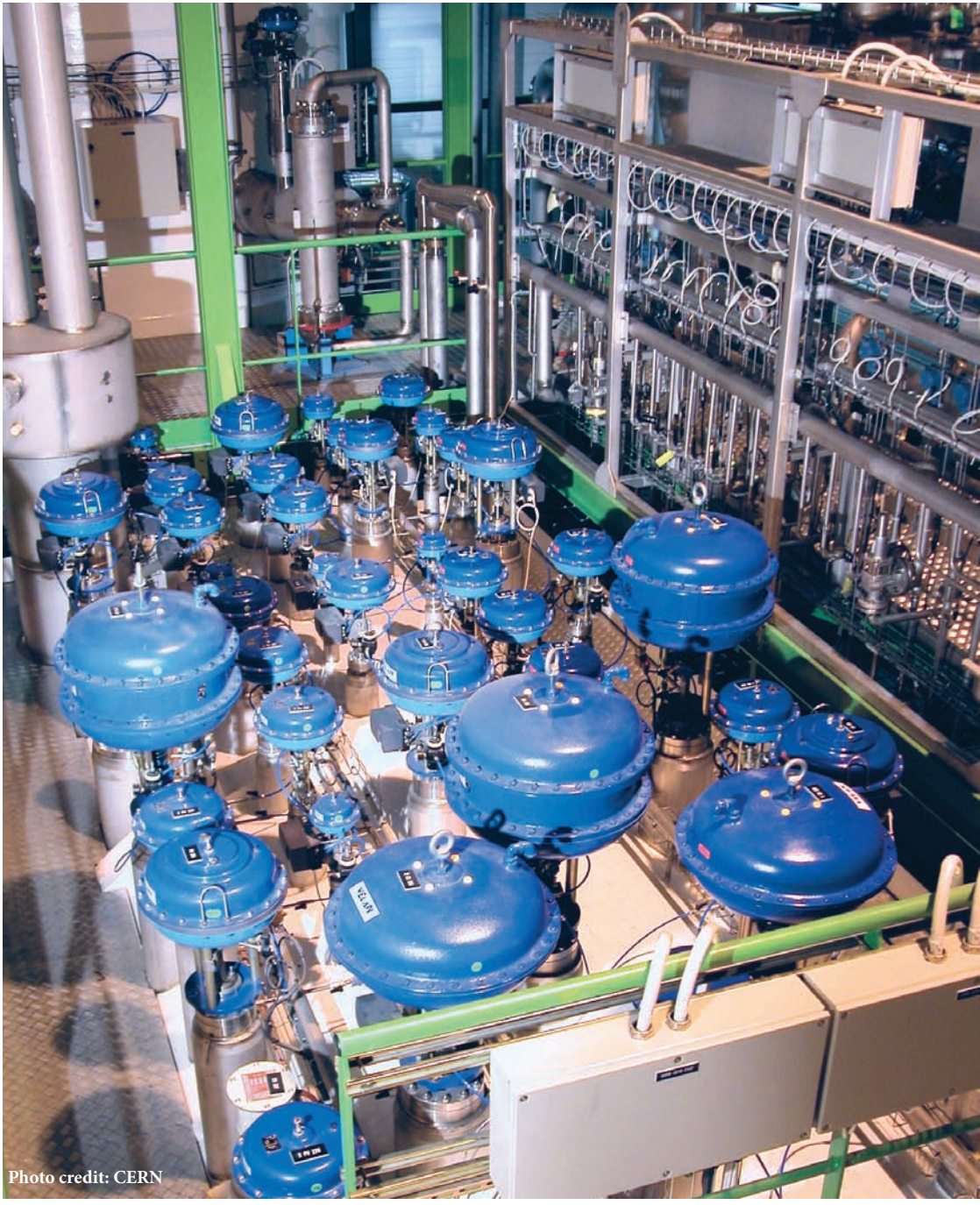
2 Zeeya Merali, *"The Large Human Collider,"* Nature 464 (March 25, 2010): 482-84.

3 With permission of CERN.

The cold facts on cryogenic valves at CERN

The Velan valves at CERN face some of the most challenging conditions known to man.

By Raphael Couturier



Some of the 2,500 Velan cryogenic valves for liquid helium at 1.5K above absolute zero (-271.5°C) installed in the LHC at CERN.

In 1848, the esteemed British scientist William Thomson (Lord Kelvin) became the first person to formally define absolute zero when he published his paper "On an absolute thermometric scale." In this groundbreaking work, he postulated that absolute zero (or 0 Kelvin) was equivalent to -273.15°C (-459.6°F). Interestingly, at approximately the same time, a number of international scientists were experimenting with processes to liquefy gases. They discovered that this transformation could be achieved by drastically cooling and pressurizing a gas, which caused its molecules to slow down and collapse, thereby forming a liquid.

Almost 30 years later in 1877, French physicist Louis Paul Cailletet and M. Pictet of Geneva simultaneously discovered a way to liquefy oxygen. In 1892, England's Sir James Dewar developed the first vacuum-insulated vessel for storage of cryogenic fluids. And then in 1894, Professor Kamerlingh Onnes in the Netherlands first used the word "cryogenics" in reference to the liquefaction of gases such as oxygen, nitrogen, hydrogen, and helium.

Cryogenics defined

The word "cryogenic" originates from the Greek words "kryos" meaning "frost" and "genic" meaning "to produce." But beyond this linguistic lineage, there is no strict definition of what qualifies as a cryogenic valve. It is, however, generally accepted that cryogenic valves are those designed to operate at temperatures lower than -46°C (-50.8°F), this being the lowest temperature in which standard carbon steel materials and standard stem packing can safely be used. Whether they are globe, check, ball, butterfly, or control valves, what these cryogenic valves have in common is that they are made of resilient materials that can withstand low-temperature service, and they are supplied with a bonnet extension.

Cryogenic valves at work

Cryogenic valves are generally used in liquefied gas applications, such as air separation processes (e.g., oxygen and nitrogen); petrochemical processes (e.g., ethylene, propylene, hydrogen); and liquefied natural gas (LNG) processes. They are also used in gas-to-liquid (GTL) processes, aerospace storage facilities (e.g., liquid oxygen and liquid hydrogen), in

numerous processes in research laboratories, and in particle accelerators and superconducting magnet applications (e.g., liquid helium). Although most cryogenic valves operate comfortably in temperatures ranging from -46°C (-51°F) down to -253°C (-423°F), valves working at exceptionally low temperatures (e.g., liquid helium at -268°C or -450°F) call for more specialized features.

Design features

Obviously, handling cryogenic fluids such as LNG, oxygen, hydrogen, or helium at such low temperatures can be dangerous. Consequently, cryogenic valves must meet the following functional requirements:

- Tightness at cryogenic temperatures.
- No loss of performance during temperature changes.
- Good ductility of material at cryogenic temperatures.
- Tightness during fire.
- Minimum heat leak.
- Operability during emergency service.
- Easy maintenance.
- Ability to withstand seismic conditions (for on-shore facilities).

In addition, they must have specific design features:

- Flanged or butt-welded. Butt-welded ends are generally selected for lines conveying liquids with heavy thermal changes where seismic requirements and safety are a major concern. They are generally used in LNG receiving terminals (on-shore facilities) where local safety authorities (such as the U.S. National Fire Protection Agency) recommend minimizing the number of flanged joints, and for very low-temperature applications (-250°C or -418°F and below).
- Low fugitive emissions must be ensured at all times, even during changes in temperature. The torquing of all components must take into account both pressure and bolting relaxation during cool-down. What's more, external loads resulting from seismic calculations and vibration must also be considered. Gaskets, which have a limited load relaxation characteristic, are generally recommended for this application.
- The seat (internal) tightness must be durable and the sealing element used must be highly resilient (for example, as found in metallic seals). In addition, there must be minimal friction when the valve is in use.
- Ease of maintenance is often a critical criterion for cryogenic plant owners. They want to be able to replace sealing elements, for example, without having to dismantle the valve trim and the actuators (especially important when butt-welded valves are used).
- The bonnet extension must be long enough to ensure the stem packing stays at a high enough temperature to keep the packing material operating within its normal temperature range.
- Pressure boundary parts must be protected against the kind of overpressures that can result from fluid-thermal expansion during a sudden change of state (e.g., from liquid to gaseous). The valve must therefore be designed to relieve any pressures above normal working pressure that may build up in trapped cavities, due to either thermal expansion or evaporation of liquid.
- For very low temperatures, such as those found when working with liquid hydrogen (-252°C or -421.6°F) or liquid helium (-268°C or -450.4°F), the use of stainless-steel bellows is recommended to ensure the optimum tightness of the valve shaft.

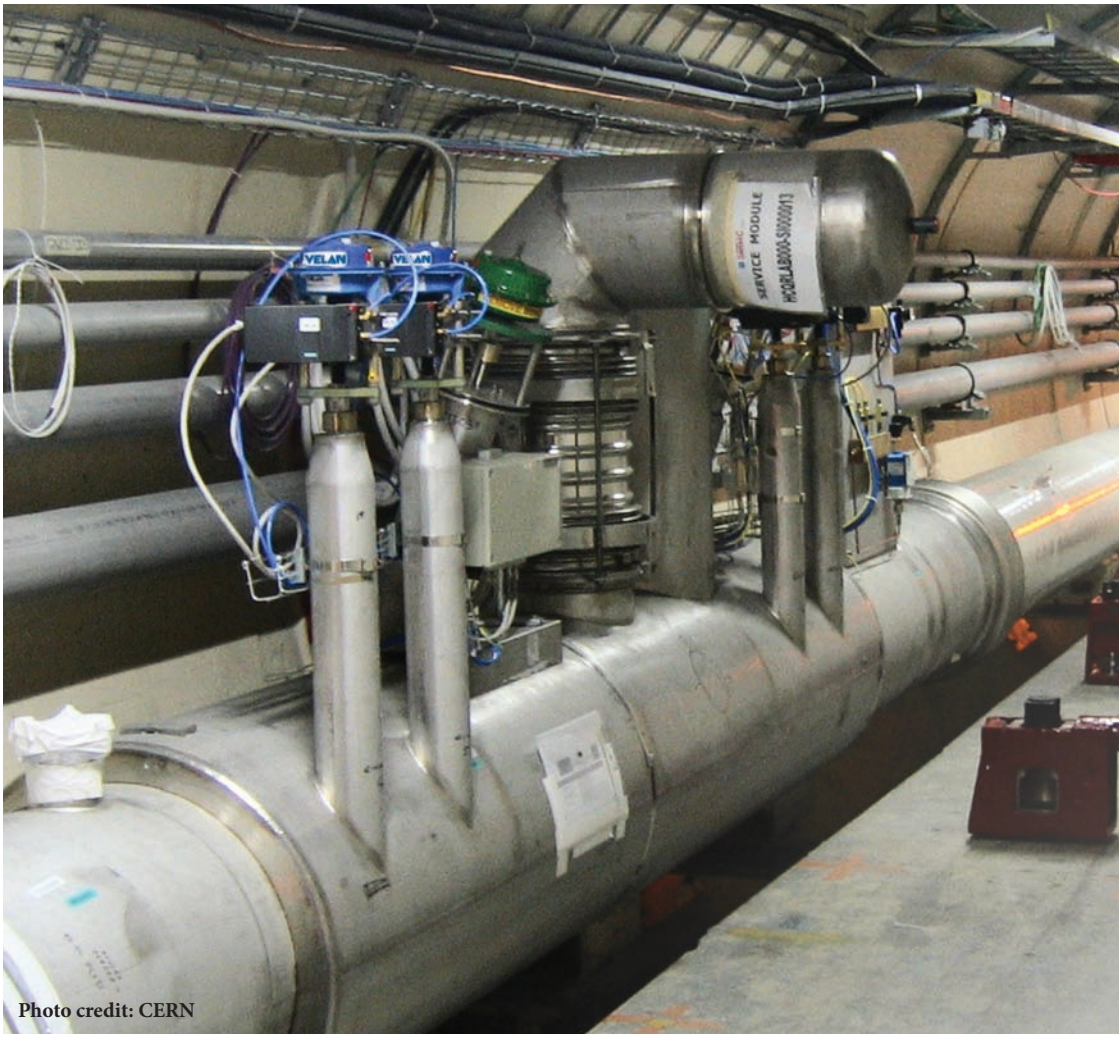


Photo credit: CERN

Velan cryogenic control and quench relief valves are installed in the LHC at CERN.

Cryogenic valves in "cold rooms" at CERN

The cryogenic system of the LHC handles 700,000 liters (1,849,204 gallons) of superfluid helium at a temperature of 1.8K (-271.35°C or -456.16°F) inside the tunnel. 2,500 cryogenic valves working at those temperatures are installed at various locations in the cryogenic lines and around the two super-giant helium liquefiers.

Valve specifications

- Fluid: super fluid helium service (temperature: 1.8K).
- Working pressure: class 150 or 300.
- Cv: from 0.01 (DN 6) to 1000 (DN 200).
- No risk of icing or jamming when operating.
- Very low heat leak.
- Resistant to radiations.
- Excellent seat tightness.
- Linear or equal percentage flow characteristic.
- Top entry for easy maintenance.
- Possibility of installation in "cold boxes."
- Thermal collar to improve heat leak.
- Standard connections: butt weld ends.

Velan cryogenic valve testing in Velan's manufacturing plant in Lyon, France.

- To reduce the oscillation (Taconis phenomenon) caused by the temperature gradient between the cold and hot areas of the valve, both the volume of the valve's bonnet extension and the size of the gaps between its shaft and the bonnet extension must be carefully determined.

High-performance materials

Cryogenic valves must also be made of materials that ensure top performance at cryogenic temperatures. As the temperatures decrease in cryogenic applications, the metal's resistance to wear and hardness increases. On the other hand, the metal's resilience decreases dramatically at the transition temperature, when it becomes less ductile and more brittle. This process is also further affected by the rate of temperature decrease and the sudden concentration of stress.

The most commonly used materials for cryogenic applications are austenitic steels, which are composed of 16%–25% chrome and 9%–22% nickel, and have limited (less than 10%) ferrite content. These steels can be brought down to near absolute zero temperatures and, because they are so chemically stable, their transition from the ductile to the fragile state is less severe than with non-austenitic steels. In addition to austenitic steels, other alloys such as Inconel, Monel, Invar, or titanium also behave well at cryogenic temperatures.

Although valves with metallic seals are generally better for cryogenic applications, it is also possible to use non-metallic materials such as Voltalef or Kel'f. In particular, Kel'f is very stable chemically, and its creep resistance (resistance to stretching in the direction of the greatest tensile stress at cryogenic temperature) is far better than that of PTFE (polytetrafluoroethylene). Vespel—a plastic that is extremely useful in hostile and extreme conditions involving radiation—can also be used for valve seals or valve plugs. Graphite is an essential component in valve sealing as well, because it maintains its tightness performance from cryogenic temperatures up to very high temperatures (as one would find in boiler applications, for example).

Whatever the material chosen, its resilience must be verified by performing an impact test (known as the Charpy method) at cryogenic temperatures (generally -196°C or -320.8°F).

Valve technology at work at CERN

To meet the LHC specification, cryogenic bellows seal globe control valves with angle-type bodies were selected for CERN. These valves have the following specific design features:

- Compared to conventional cryogenic valves, the valves used for this application have a longer bonnet extension due to the temperature of the fluid.
- In addition, the extension bonnet is fitted with a thermal collar brazed on the stainless-steel material. This helps "break" the temperature gradient between the fluid at 1.8K (-271.35°C or -456.16°F) and the atmosphere at 300K (57°C or 134.6°F) and reduce the heat leak on the super fluid helium.
- To eliminate the risk of icing and jamming and thus increasing the level of tightness, the valve stem and packing are isolated from the fluid.
- Valve sealing is ensured with a soft seal made of a special radiation-resistant material that can work at the required temperatures.
- For optimal safety, the valve body is made of one-piece forged material (resilient stainless-steel).
- The valves are prepared at the factory with a stainless-steel collar so they can be easily welded and installed in the cold boxes.

The long journey to CERN

From the first demonstrations in 1877 of the liquefaction of oxygen by Cailletet in Paris and Pictet in Geneva, cryogenics has grown to meet an ever-expanding demand. As far as Velan valves are concerned, working at such extremely low temperatures (-271.35°C or -456.16°F) and on such a large scale project clearly demonstrates that it is indeed technically possible to control fluids at extreme temperatures with total safety. **|VV|**

More Velan cryogenic control valves, including bellows seal jacketed valves with a double shell.

About the author

Raphael Couturier is Sales Director for Velan S.A.S, the French affiliate of Velan Inc.; he was previously the Manager of the Cryogenic and Control Valves Department. Raphael holds a Master's degree in mechanical engineering from the National Institute of Applied Sciences of Lyon (France) and an MBA from The CECE Aix-Marseille (France).

He started his career in 1993 in the valve industry and joined Velan in 2003. Raphael has considerable international experience in the sales and marketing of specific valves for heavy-duty applications and in the field of cryogenic valves for LNG applications and super-cryogenics.

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NOTE: Some of this information has previously appeared in "The cold facts on cryogenic valves," *Valve Magazine*, 2008.

Cryogenic valves for a wide range of applications

Velan offers the most complete and most technically advanced cryogenic valve product line available from one source, including gate, globe, check, ball, double or triple-offset butterfly, and control valves for liquefied gases, LNG, research labs, and superconductivity for particle accelerators and aerospace.

- LNG trains, terminals, and carriers
- Petrochemicals and gas processing
- Liquefied helium, hydrogen, oxygen
- Superconductivity applications
- Aerospace

Building a strong relationship in Brazil

A country of great opportunity

Velan's success in Brazil, one of the world's top markets today, is a good illustration of what can happen when a seed is planted in a very fertile environment and blossoms into a fruitful relationship.

The Iguazu waterfall system in Brazil consists of 275 falls along 2.7 kilometers (1.7 miles) of the Iguazu River, and some of the individual falls are up to 82 meters (269 feet) in height.

In Brazil's case, that relationship is with Fittinox, a division of Grupo Feital, a family-owned corporation that is one of the largest distributors in all of South America. Fittinox-Feital is headed by Oswaldo Feital, the son of Grupo Feital's leader Marcos Feital and the grandson of the company's founder, also named Oswaldo Feital.

What began as an idea for a logical new product line for Grupo Feital to distribute to its market has grown to a 15-person division within the company focused solely on Velan products and having its own sales and technical personnel. Velan's Sergio Pensotti, Director of Latin America, explains how this interesting opportunity was born: "The Feital group is a powerful, well-run organization known for its top-quality line of stainless-steel rolls and plates and, more recently, for fittings and piping. Velan approached the company about 10 years ago with the idea that valves would be a natural extension of that line."

However, the company approaches new ventures only after thorough research, and since its leaders were not initially familiar with what goes into a quality valve, a series of meetings to trade information between the two companies began.

"Feital had a tremendously important decision to make because they were deciding to invest a large amount not only in terms of the additional staff they'd need, but also in inventory. To be a successful distributor in such a dynamic market, you have to invest in a fair amount of stock because once you start selling a new line, things can happen pretty fast. We worked together at a feverish pace to make this happen."

Oswaldo Feital (left), his sister Maria Laura, and Sergio Pensotti in the new warehouse.

Getting to know your business partners

Sergio Pensotti explains that one of the things he's learned in getting to know the Feital family is that the strength and determination it takes to be a talented, award-winning athlete translates well into skills for running a top-notch company.

For example, Oswaldo Feital, who Pensotti says is a hands-on manager with a thorough understanding of every aspect of his business, and his wife Viviane are both accomplished swimmers. Pensotti found this out, however, only by chance.

"Oswaldo and I were at dinner in Montreal and we both said we wanted to make an early night of it. I explained I wanted to get up and do some laps at the Olympic pool nearby, and Oswaldo asked if he could go along," Pensotti explains.

"I'm swimming along and I happened to look back and I thought, 'oh dear, he's not there.' But then I look ahead of me and see he's already reached the end of the pool. I thought, he's not a man, he's a human torpedo!"

When Pensotti asked him how he could swim so fast, he found out that both Oswaldo and his wife had been competitive athletes—that Oswaldo was, in fact, the Brazilian junior champion of freestyle swimming and his wife had been the captain of the country's water polo team.

"That was a very quick lesson for me in why Oswaldo is such an accomplished and driven businessman," Pensotti explains. "And you can bet that the latest addition to the Feital family, Oswaldo's newborn son Luc, carries all the best genes you need to become extremely successful both in sports and in business!"

Oswaldo Feital adds, "We met with quite a few companies before establishing our relationship with Sergio, and through him, with Velan. What impressed us most was the proven reputation that Velan products had in the market; we believed our partnership would be relatively risk-free since we knew we could honestly stand by their products. What's more, both Feital and Velan approach business with the same high ethical standards, so our working styles were very compatible. We got off to a pretty aggressive start with marketing and advertising and gained considerable market share very quickly. I think it's safe to say that the relationship has been very good for both of us."

In the decade since, Velan has learned not only how well the Feital Group operates, but also how tough business in Brazil can be.

"In Brazil, you have one of the top markets in the world. Because of that, and because business has gone down in many other areas of the world, everyone is doing whatever they can to break into this important South American country. As a partnership, Velan and Feital are very well known in Brazil and on top of every single AML (authorized manufacturers list). But you have competition from everywhere, including the companies that go in focusing on lower prices instead of offering high-quality product," Pensotti says.

> ***"In Brazil, you have one of the top markets in the world."***
> **— Sergio Pensotti**

However, Fittinox-Feital has several very powerful tools in its toolbox that help with the competition. The Feital association itself has eight warehouses in the country, the newest and largest one more than 35,000

The newest and largest Feital warehouse located in Riberao Pires, Sao Paulo, is more than 35,000 square meters (377,000 square feet) in size.

square meters (377,000 square feet) in size. The Fittinox-Feital division also has its own fully staffed service shop. But perhaps most important of all, the company has devoted its marketing muscle to the valve division and has the technical expertise it takes to succeed.

"The Fittinox-Feital sales forces is very knowledgeable about what they are selling, and it's that kind of knowledge that makes it a success in a country where there are never-ending technical and commercial requirements," Pensotti says. Those industries include oil production and refining, petrochemical, alcohol and ethanol products, gas, pulp and paper, mining, and chemical and pharmaceutical, to name a few.

Meanwhile, the business link between Velan and Fittinox-Feital continues to grow and strengthen, driven in part by the fact that the Velan-Feital relationship is long term and very close.

"Good business is very much dependent on the human relationships that develop," Pensotti explains. "It's getting to know the people you are dealing with, going out to dinner with them and their families, and learning what's important to them. This is a very family-oriented, people-driven business here in South America." **|VV|**

Michael Zivic (left), Velan's Vice President of Sales, International, with Oswaldo Feital at the Expomin trade show in Brazil.

Petrobras is a state-controlled oil company that has many platforms off the coast of Brazil. This P-56 platform is equipped with a large number of Velan valves and produces about 180 thousand barrels of oil and 6 million cubic meters of gas per day when operating at full load.

Brazil: a rising world power

While most of the world is faced with debt and unemployment, Brazil is embracing an economic boom. As the last country to enter the recent recession, it is also one of the first to leave it behind and will soon overtake France and Britain as the world's fifth-largest economy.

The world has undergone major political and economic changes in recent years as new centers of power have emerged, a transformation accelerated by the global economic crisis. Brazil is one of the countries to most benefit from this new international reality, largely because of its political and economic stability over the past decade and a half.

It is also a member of what has been dubbed the "BRIC" countries, as Brazil, Russia, India, and China are known, a grouping that has become one of the new players on the international scene in recent years. While most of the world's economies are stagnant, Brazil's is growing at 7%, which is three times faster than North America.

Topographically, Brazil is an enormous country, slightly larger than the continental U.S. It also has huge amounts of arable farmland and a long list of natural resources, and 14% of the world's fresh water. Perhaps it's not surprising then that 80% of its electricity comes from hydropower.

It's also oil rich. That's because 240 km (150 miles) off the coast there lie what are believed to be the largest discoveries of oil found anywhere in the world in the past 35 years. Petrobras, the state-controlled oil company, is preparing to drill 6,096 meters (20,000 feet) below the surface of the Atlantic to reach oil fields that sit underneath salt beds. What's more, Brazil is the largest producer of iron ore in the world and the world's leading exporter of beef, chicken, orange juice, sugar, coffee, and tobacco, much of it bound for the burgeoning Chinese market.

What are the challenges that Brazil now faces? According to forecasts from governments and institutions such as the U.S. National Intelligence Council, it must continue to focus on modernization by making reforms to such societal structures as taxes, health care, social security, and the labor market. And if it does it right, they believe Brazil may well assume its position as an economic superpower over the next 15 years.

Key facts about Brazil

- Population: 193.7 million (2009)
- Urban population: 85.2%
- GDP per capita: $8,205 (2008)
- Life expectancy: 76 (women), 69 (men)
- Main exports: Manufactured goods (including aircrafts), iron ore, coffee, oranges, other agricultural produce
- Main trading partners: United States, Argentina, China

Source: UN, World Bank

A conversation with...

Victory Sourcing's Peter Gerster

Velan learns a great deal by talking to its distributors about how they came to partner with the company and what their formula is for success. Here, we talk to Peter Gerster, President of Victory Sourcing, who has won awards and accolades for his teamwork approach.

Getting the job done: Peter Gerster, President of Victory Sourcing, with Velan's Osvaldo (Ozzie) Rodrigues, Manager, Quality Control, Plant 1.

VV: What is your personal background?
Apart from my college years, I've lived in New England all my life. I'm the third of four kids. My dad, still lively at age 92 and a master amateur marine artist, was chief of surgery at the local hospital. He jokes that our friends' various breaks, scrapes, and mishaps helped put all of us through college.

I'm from a family of doctors. In addition to my dad, both of my grandfathers and a great-grandfather were all surgeons. The medical gene skipped our generation; none of us four kids pursued that path, but a number of the grandkids are currently in med school.

I went to Ohio University back in the '70s. I played lacrosse and varsity hockey. That was my first go-round at working closely with a group of Canadians—most of my teammates were from Canada on hockey scholarships. What a great group of guys. We didn't win a lot of games but we had a lot of fun. Sadly, my French hasn't progressed much beyond a few choice words I picked up during those long hours on the team bus.

I was an English major and after graduating I didn't really know what I wanted to do. I coached high school lacrosse. I worked in carpentry and as a bay scalloper up on Nantucket Island. I had my own scallop boat and to this day, I can open scallops with the best of them. As idyllic as island living was, I had also gotten married and my wife, Sandra, and I decided that it was time to "get serious," so we moved back to my hometown in Connecticut and, eventually, to ad agency jobs in Manhattan.

VV: How did you get involved in sales and distribution?
I worked as an advertising account executive on national campaigns in all major media: print, outdoor, radio, TV. My accounts included apparel, margarine, sausages, liquor, office products, industrial goods. I sold old products and new products. It was a great way to learn about marketing and sales, about meeting deadlines and coordinating various agency efforts and departments. Cajoling a copywriter into getting your client's material ready on deadline isn't all that

different from coaxing a plant manager or a quote administrator to get valves made to meet a customer's expedited schedule or a quote turned around quickly.

After several years in the ad business, I took a leap of faith and partnered up with an old friend who had his own industrial sales company. That was my introduction to repping valves and the like. A few years later, I struck out on my own with Velan as my major product line. Nearly a quarter of a century later, here we are.

VV: What about selling for a company appeals to you as a professional?

For me, it's a "best of both worlds" type of thing. Harking back to when I had my own scallop boat and, before that, my own painting company while in college, I guess I've always had a bit of an entrepreneurial streak. I like having my own company and representing a manufacturer's products. Being involved in so many facets of the business certainly doesn't allow time for boredom.

A young(er) Peter Gerster hits the ice.

Scallop harvesting anyone?

VV: Have you been affiliated with the power industry all of your career?

My first valve sales were to paper mills as well as to power and chemical plants. When I was formulating the business plan for Victory Sourcing, we strategically defined the power industry as a key market. The Northeast is densely populated and power was, is, and will remain an ongoing need. Initially, we sold to most of the utility companies in the region. One of our largest accounts was Con Edison of New York. Over time, however, the business model has changed, and we now concentrate primarily on engineering firms and project work.

VV: Tell us a little bit about Victory Sourcing.

We started the company in 1987. Initially we had several employees. After a couple of years, our first young salesman got married and moved out West. Our inside sales coordinator was a registered nurse who eventually left us to get her Master's degree in psychiatric nursing. (I don't know if that's a comment on our management style.)

A neighbor worked with us for many years, part-time. The last several years I've pretty much gone it alone. My wife has been a constant in the business since day one. I sell. She bills. (And lets me know when I'm not selling enough.) Just recently our son, Philip, has come on board as a salesman. To that extent, we somewhat mirror the Velans in that we are a family company.

VV: How did you become affiliated with Velan in the first place?

I started out with some other manufacturers' high-end specialty products. Velan's vast range of high-quality products was especially attractive in broadening and rounding out our offerings. Finding manufacturers was pretty much word-of-mouth. I was aware of Velan through the Power-Gen shows and the like. This was pre-internet days, and it wasn't possible to just "google" a client. I distinctly remember driving up to Montreal and pitching my young company to Ivan Velan. I always appreciate that he listened and gave us a chance. Over the years, working with top-notch master distributors like Zenith Supply in Pittsburgh has also been essential to our success.

2009 recipient of the Joe Casey Award

Peter Gerster's company, Victory Sourcing, was formally recognized for outstanding representation for Velan valves in 2009, receiving the Joe Casey Award at the Velan Sales Conference.

Casey was first hired by Velan in 1983 and rose through the ranks to V.P. of Sales, U.S.A.; he passed away in 1996 after a long illness. Joe Casey exemplified what it takes on the Velan side of the teamwork approach to succeed: A great personality and demeanor in dealing with business issues, as well as incredible drive and energy that enhances our company's standing with distributors and end users.

The award is given to organizations who have achieved a long-term successful business relationship with Velan. It is an honor to be given this award, which commemorates a company instrumental to our mutual success.

VV: How has the relationship evolved over the years?

In essence, despite ups and downs in the economy, despite greater market globalization and changes in competitors and customers, the basics of the relationship have remained constant. My job as a rep is to sell to my defined part of the market; to provide expertise and good service to customer and manufacturer alike. A rep is a conduit, of sorts. Providing a good product on time and at a good price is what it's all about. Everybody wins.

> ***"During my nearly 25 years as a Velan rep, I've had the good fortune to work with some terrific people at Velan who have been invaluable in the success of both companies."***
>
> **— Peter Gerster**

VV: What have been your most challenging projects concerning Velan valves?

In reality, almost every order, small or large, is unique and is a challenge until it ships. I've had as much anxiety over getting one lone valve shipped on time as I've had shipping a whole project. What I've learned over the years is to appreciate the amount of time, work, and energy it takes to spec, design, and produce a valve, as well as to coordinate and complete a project for which there may be over 100 different types/sizes/flavors of valves made at five different plants with materials being sourced from around the globe.

There are a bunch of great folks at Velan, and I proudly represent all of them. I may drive them nuts at times but, in the end, we are all on the same team. During my nearly 25 years as a Velan rep, I've had the good fortune to work with some terrific people at Velan who have been invaluable in the success of both companies. **|VV|**

The teamwork approach

One of the most crucial aspects of being a successful representative is an ability to balance the needs of clients with the realities of deadlines, costs, and challenges of production. To succeed on both sides of that scale requires an ability to see any project as an opportunity for real teamwork.

Paul Lee, Vice President U.S. Sales (Eastern Division), who has worked with Peter Gerster and Victory Sourcing since 1993, explains that: "Peter's role is much the same as our own. We're both facilitators whose job it is to make a system work."

Along the road to success in selling Velan's products, "Peter's methods have evolved into maintaining very close contact with Velan staff," as well as developing an extensive knowledge of the Velan product and the industry standards and customer specifications that pertain to those valves, Lee adds.

Grant Smith, Corporate Expeditor, says one of the reasons Gerster has been successful is that "he doesn't try to sugarcoat a situation. Peter is someone to whom you can present the plain facts, including those that may not be so favorable to his projects, and instead of coming back at you with a negative attitude, he rolls up his sleeves and says, 'Well, how can we work together to make this happen?'" Smith has been with Velan for 33 years, so he speaks from experience when he shares his thoughts on what makes a successful representative.

"If our relationship with Victory and Peter has changed at all since the early days, it's only to get better. I would not hesitate in the least to bring Peter into the middle of a potential roadblock in a project and know that his reaction will be constructive, and I can share information knowing it won't come back to haunt me. As a result, Peter has developed a level of trust within our organization," Smith explains. "He just doesn't get bogged down by the details and emotions of a situation."

Heidi Sinclair, Project Sales Administrator, adds that: "Over the years, Peter has developed relationships with key personnel in our company. He is unique in his ability to interact with each department in meeting the client's requirements and providing on-time delivery."

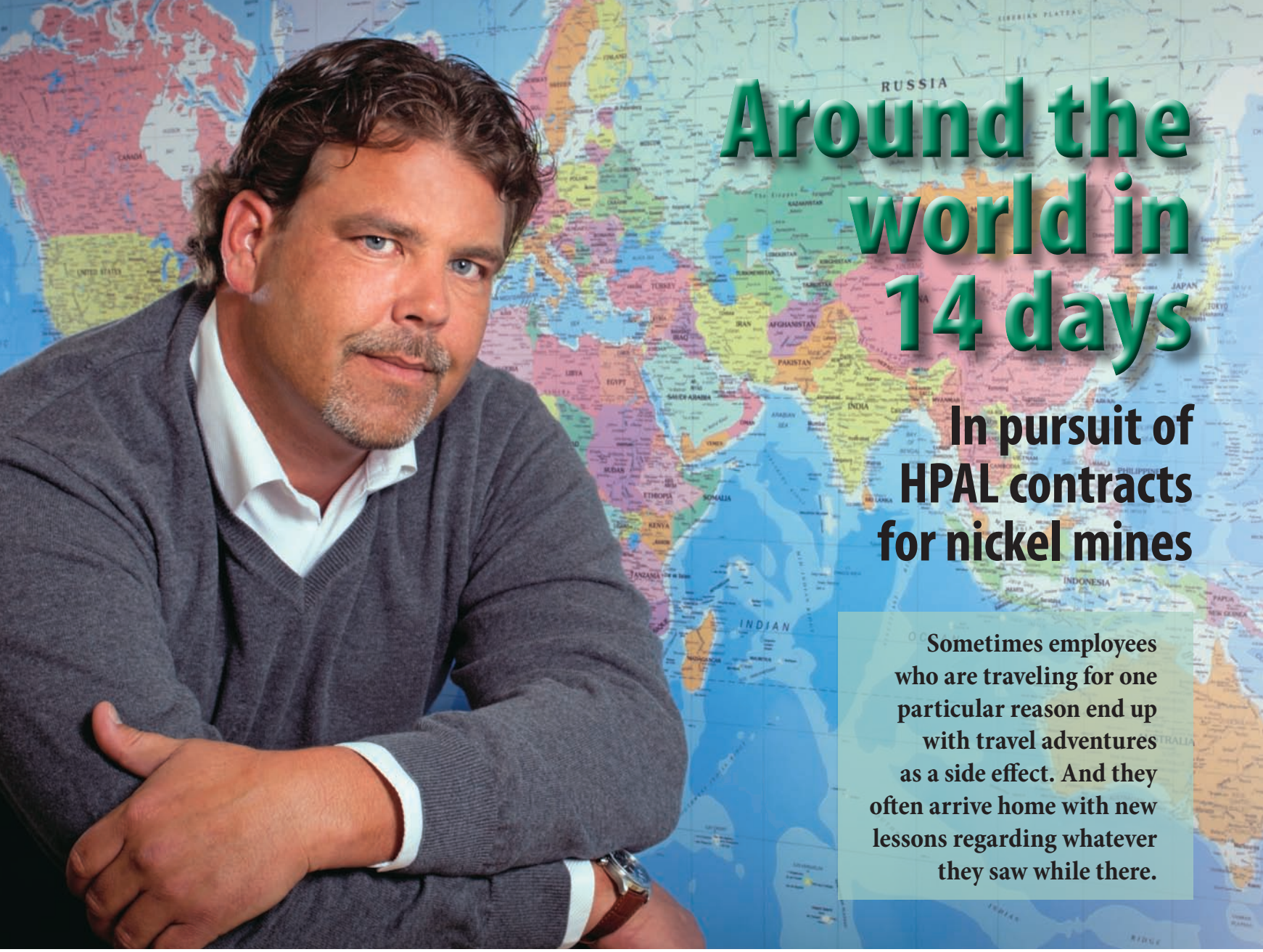
The backbone of this type of teamwork approach is communication.

"One of the talents it takes to be a good communicator is developing an ability to listen," Lee explains, and then to clearly exchange the right kinds of data to get the job done. "This level of communication is how the trust develops in a team," Lee says. "Peter is bringing information into Velan. Those of us who work with him at Velan are analyzing that information and giving Peter a response, which he then takes to his clients. When all of this is done properly, it helps a representative build credibility," both with Velan staff and with clients, Lee says.

And it also doesn't hurt to have a positive attitude.

"Peter does not look backward at problems that sometimes can occur during a project cycle; instead, he looks forward at how we can work together to solve them. He is a positive presence, appreciated for his hands-on approach to interacting with our employees respectfully and with much joviality," Sinclair adds.

Father and son enjoy a swim back in the day. Peter Gerster's son Phil has recently joined him as part of the Victory Sourcing team.



Around the world in 14 days

In pursuit of HPAL contracts for nickel mines

Sometimes employees who are traveling for one particular reason end up with travel adventures as a side effect. And they often arrive home with new lessons regarding whatever they saw while there.

Craig Bekins, Velan's Director of Autoclave Projects.

Craig Bekins, Director, Autoclave Projects; Peter Brkich, Product Manager, Severe Service Applications Group; and Luc Vernhes, Design Manager, Securaseal™ Ball Valves, recently returned from a two-week world-wide trip that took them to a variety of exotic locations far from Velan's head office in Montreal, Canada. The one constant in the trip, other than spending a lot of time in the air (in total, the team racked up over 31,000 air miles each), is that every one of their destinations involved mining and, in particular, the mining of nickel.

Because nickel is a key ingredient in stainless-steel valves, it's vital to much of industry. But the process of getting it out of the ground is still a tricky one, and in many cases, the mines where the ore is taken out of the earth and the plants where nickel is extracted are in remote locations in faraway places in Australia, the Philippines, and South America.

The purpose of the team's trip was threefold: to find out about potential new business with a long-time Velan business partner in Japan, to check up on how Velan's valves were operating at one extremely secluded island facility in the South Pacific Ocean, and to represent Velan at an international mining conference in Australia.

Touching down in Japan

The first stop was Tokyo, where the team met up with Velan's regional sales manager Takuya Tokumura ("Tak") and a consulting company to talk about two potential contracts. One of them would involve using Velan severe service valves in high-pressure acid leach (HPAL) processes in the Taganito region of the Philippines. The Taganito project is a large-scale hydrometallurgical project expected to produce 30,000 tonnes of nickel cobalt mixed sulfide per year. HPAL is an advanced ore refining technology that is more environmentally friendly and economical than traditional smelting methods and

that involves taking nickel out of laterite ore, which is where most new supplies come from today. Such extraction requires very durable equipment, which is where Velan's severe service valves come into play.

Brkich, Bekins, Vernhes, and Tokumura met with a Velan client headquartered in Yokohama. While Bekins is a frequent visitor to the Far East, this was Brkich's first trip to the area, and he was impressed with the politeness and sense of respect that he says permeates the Japanese society at all levels.

"At the airport, I'm looking out the window watching the plane backing up and I notice the ground crew. After they do their jobs, they all line up and wave and bow as the plane taxies," Brkich explains. At the business meeting, Brkich says what really struck him was that when a professional takes your business card, the person doesn't casually put it in a pocket as is the custom here in North America. He or she takes the card with both hands and studies it, then presents a business card back also using both hands.

This was Vernhes's second visit to Japan to meet with the customer and help close the Taganito deal. As he explains, "This is an extremely rigorous application, and it can be very helpful to have someone from engineering who is highly technical there to discuss the real nuts-and-bolts of the operations with the end users. I've found that this brings a level of confidence to the discussion, since basically they have one of the guys responsible for key elements of the valves' design and performance there in the room with them, answering tough questions and looking at them face to face."

There was another benefit behind Vernhes's trip: As a self-confessed sushi addict, he welcomed the opportunity to purchase a top-of-the-line new Japanese rice cooker and, during the next morning's breakfast, Tokumura was happy to translate the essential instructions into English as the model Vernhes had selected was only sold in Japan.

Before the team left Japan for the next leg of the trip, which was to vist one of the HPAL facilities where Velan valves are already in use, they got two pieces of good news: The consulting company they'd met with in Japan was receptive to Velan's proposal and Brkich's luggage, which had failed to make it to Japan when he did, finally caught up to him so he had a welcome change of clothes.

All roads lead to Goro

For the Velan team, the next destination was the Goro Nickel Project in New Caledonia, a small French island territory in the Southwest Pacific about 1,200 km (750 miles) east of Australia.

Luc Vernhes, Design Manager, Securaseal™ Ball Valves, safely back from his trip.

The island of New Caledonia is home to an estimated quarter of the world's known nickel reserves. The Goro nickel plant is one of the largest mining projects under construction anywhere in the world and is considered among the world's best-known undeveloped laterite ore bodies, with 55 million tonnes of estimated mineral reserves. The expected annual capacity of the Goro Nickel project is 60,000 tonnes of nickel and approximately 4,500 tonnes of cobalt, representing around 20% of global production.

"He had his window rolled down, only one hand on the wheel, and an ear-to-ear grin that made it clear his intent was to scare us out of our wits. He succeeded."

— Craig Bekins

The deposits of ore on the Goro Plateau in New Caledonia are classic in composition, which means they comprise iron oxides on the surface (laterites) and magnesium silicates beneath (saprolite). Lateritic ores are normally found in tropical climates where, over time, weathering extracts and deposits the ore in layers at varying depths below the surface. Lateritic ores are excavated using large earth-moving equipment and are screened to remove boulders. Of the world's laterite deposits, Goro has one of the highest nickel contents, and the mine is expected to have a life of approximately 30 years, during which time the mining pits will be filled and replanted at the end of each mining cycle.

A Velan Type R severe service metal-seated ball valve installation at the Goro project site in New Caledonia.

By land or by sea

The Velan team had carefully timed their visit for a period when the operation was shut down for maintenance so they could tour the facility and ensure Velan's many onsite valves were performing as expected. Getting to the remote site in one piece presented a whole new series of challenges, as Bekins recounts:

"We awoke at 4:30 a.m. to the quiet calm of a South Pacific vacation spot and readied ourselves for a day at Vale Inc.'s Goro Nickel project on the southeastern tip of New Caledonia. The project's lead instrumentation engineer, with whom we have been working for over 10 years through the various developmental stages of the Goro project, was picking us up at 5:30 a.m. to make the 50 km (31 mile) journey to the site. We were warned that the ride might be a bit bumpy, but it was supposed to be an otherwise safe alternative to taking the ferry, where a dry seat is not always guaranteed.

"The engineer arrives in what we believe was once a white truck that is now nearly covered in red mud typical of most mine sites. His jet black hair is certainly longer

than most engineers of his age, and he carries himself with the air of a rock star. As we were to find out, he not only had the look of a fast-living guitar god, he drove like one as well.

"The trip to the site actually started out very pleasantly as we made our way through the sleepy streets of Noumea, east towards the mountains, which by now were framed by a spectacular rising sun. With all forms of civilization in our rear view mirror, the road changed from a mostly well-paved, two-lane road to a single track of red dirt, interrupted every mile or two by a gentle stream that the truck crossed with minimum effort.

"As the lakes turned to ponds and the meadows all but disappeared, the road became even narrower and the ride incredibly intense as witnessed by the permanent indentations I made in the arm rest. Making sure to keep a tight grip on the door handle, I turned to face our friend the 'rock-star' expecting to see him in the classic 10-and-2 driving style we were all taught. He had his window rolled down, only one hand on the wheel, and an ear-to-ear grin that made it clear his intent was to scare us out of our wits. He succeeded."

On-site at Goro

Despite the bumpy, hair-raising trip, Bekins, Vernhes, and Brkich arrived in one piece and were immediately impressed by the sheer size of the Goro project site. In addition to the typical maze of tanks, autoclaves, and towers, the Goro site also includes a dedicated seaport to facilitate the incoming raw materials and outgoing processed nickel, sleeping quarters for up to 1,500 workers, a coal-fired

Left to right: Edgardo Caunin, Assembler; Peter Brkich, Product Manager, Severe Service Applications Group; and Hafid Echikr, Assembly Foreman, Securaseal™, inspecting a valve in the plant.

power plant, a sulfuric acid plant, and two pipelines—all in the middle of the jungle.

While in transit to their first meeting, the intrepid travelers were greeted by one of the maintenance engineers with whom Bekins had worked on past projects. As Brkich recalls, "He looked at us and said: 'Your valves are working great. We're not having any problems … so why are you here again?'" Bekins adds, "That's exactly the kind of on-site feedback we love to hear."

After an extremely informative and productive day, which included a complete tour of the facility and a walk-through on the autoclave where the bulk of the Velan valves are installed, it was time to make arrangements to return to Noumea. As Bekins puts it, "The choice was to either get back in the 'truck of death,' which had now been washed clean by an hours-long tropical deluge that had surely swelled the streams to near river status, or crowd onto the ferry that would promise a much more relaxing but potentially wet trip back to civilization. We chose the ferry."

One last stop in Perth

The final stop on their voyage was to the annual ALTA Nickel-Cobalt Technical Conference and Trade Show in Perth, Western Australia. The show, which brings together the engineers, operators, and suppliers to the mineral processing industry every May, is a great opportunity to keep tabs on existing projects and to get early leads on new opportunities. After covering much ground (both literally and figuratively), the Velan team was happy to be in one place for a few days. They also took advantage of this time to catch up with some old friends and colleagues, including Velan's Australia-based Regional Sales Manager for Asia-Pacific, Jim Thanos, who has been a key contributor to Velan's success not only in the Australasia region but in the mineral processing market as a whole. After three days of manning the booth, attending technical sessions, listening intently to the needs of the market, and of course taking in the natural beauty of Perth, it was time to get ready for the long haul back to Canada.

The home stretch

Arriving home for all of the team members was a welcome process that allowed them to reflect on what they'd learned. As Bekins explains it: "I sat down to a long-awaited dinner with my family with a new awareness and appreciation for the importance of nickel mining. I looked around at the gleaming metal appliances in the kitchen, our cutlery, our pots and pans and realized that these stainless-steel products were probably in some way connected with at least one of the sites we'd been to in the last two weeks." **|V V|**

Velan valves designed specifically for pressure leach (autoclave) processes

The Pressure Acid Leaching (PAL) process has been around since the 1950s. But it wasn't until the late '80s that dwindling sulfide ore beds and increased environmental restrictions made the world's nickel miners take a serious look at the PAL process, which at that time had already been successfully modified to process gold using what is known as the POX (Pressure Oxidation) leaching process.

By using new material developments and a growing understanding of how far base metals could be pushed in terms of pressure, temperature, and corrosion resistance, process engineers worked to optimize the process, which by the mid '90s was referred to as HPAL or High Pressure Acid Leach.

Today, Velan's extensive supply, experience, engineering resources, and back-up service and support stand behind a tried-and-true design that has evolved over a period of decades delivering over 2,000 valves to the HPAL and POX processes. These valves offer advanced ceramic coatings of the latest available materials and technologies optimized for the rigors of autoclave processes.

"We've definitely proven ourselves over the years in a highly competitive and demanding industry," says Bekins. "We have dedicated support—both in the factory and in project management—combined with over 25 years' experience in the design and supply of severe service solutions."

Velan's HPAL history

Velan first became involved in autoclave applications in the 1990s when Moa, Cuba, was the only Pressure Acid Leaching (PAL) plant in existence and the Nevada Pressure Oxidation (POX) projects were just getting underway. The Porgera and Lihir gold operations in Papua New Guinea followed in the mid '90s and by the end of the decade Velan was selected as the sole supplier of severe service ball valves to the Murrin Murrin nickel-cobalt plant in Western Australia: Almost 15 years later, Velan is still the only severe service ball valve in use at the plant—the longest running, large-scale HPAL plant in the world.

After a slow start to the new millennium, skyrocketing demand for stainless-steel sent the price of nickel though the roof. With nickel trading at record prices, dozens of new projects were suddenly viable and the race was on to tap into the massive lateritic ore beds that had been sitting untouched in Australia, Philippines, New Caledonia, Canada, Madagascar, and Brazil. With several projects progressing at a furious pace, Velan expanded its capacity to feed the growing demand and, within a five-year span, participated in a number of the largest projects, including:

- **Coral Bay Nickel** (Philippines), which is known to be one of the most efficient and reliable HPAL plants in the world, reaching 110% of nominal design capacity within its first year of operation
- The massive **Goro Nickel plant** (New Caledonia)
- At the end of boom, the **Ambatovy Project**, which, at a total of five autoclaves, will be one of the largest lateritic nickel plants in the world, with a planned annual output of 60,000 tonnes of nickel, 5,600 tonnes of cobalt, and 190,000 tonnes of ammonium sulphate (an effluent that can be used as fertilizer).

According to Bekins, managing these massive projects in often remote installations is far from easy. "These are complex projects where there's very little leeway for error or miscalculation. That's why it takes focused, proven suppliers to make these processes work as safely and reliably as possible."

Velan metal-seated ball valves.

Systems that keep workers safer

Working behind the scenes, Hicham Guessous Doss, Engineer, Electrical Control Systems, tests the voltage on a PLC (Programmable Logic Controller) input-output module.

Although the Velan name is best known for producing a tangible product—high-quality valves—the company also offers something else: well-established expertise in a wide range of industries. One of the ways that this expertise is put to good use is in projects where Velan has partnered with other industry-leading companies to create valves and control systems designed to increase on-the-job safety.

One such project is currently in factory-acceptance testing, ready to be shipped out to the client's refinery later this year. A team of Velan engineers is working with a dedicated partner with significant experience in control automation projects for the oil refining industry and other hazardous environments. The team has successfully designed and assembled a control system implementing an interlock logic provided by the end user that will ensure a large multinational company has the safest possible operations for its new refining plant in India.

Knowing the processes inside and out

The people who work on such systems must have an expert understanding of the process of refining and coking within the refining environment. And they need the technical ability to translate that knowledge into a physically robust system of monitoring and operations that eliminates some of the unnecessary risks in coking, which can be a dangerous operation.

During the pre-installation testing process, a control system can look to the uneducated eye like a huge bunch of wires, panels with blinking lights and push buttons, and rows of touch screens with detailed schematic displays. But it's much more than that.

"The system controls the actuators that are responsible for opening and closing valves at critical times during the coking process," says Brian Simmons, Manager, Severe Service Applications Group, who heads up the team working on this project. "We implement an end-user logic into the process to ensure, for example, that when certain valves are open others cannot be opened—since doing so might compromise the safety of the operations," Simmons explains.

How cokers work in refineries

"In layman's terms, during the distillation of crude, after the lighter fractions have been boiled off, the remaining heavier fractions are sent to the coker unit, in order to squeeze out more usable products. During the delayed coking process, the resid (residuum) is heated up to a temperature of over 500°C (900°F) in a great big furnace until it breaks down to form more useful fractions and coke," Simmons says.

"The extreme heat of the process thermally cracks the long chain hydrocarbon molecules in the tar feed into shorter chain molecules," Simmons explains. "After the furnace, the hot mixture of vaporized hydrocarbons and newly formed coke particles flows into a large silo-like coke drum. In the drum, the heavy coke particles settle and bunch together into pebble-sized grains, and the lighter vapors are returned to the distillation column for further refining."

"The customer has to give us detailed specifications of exactly what he wants the system to do. We then work with the team members to figure out how to make it happen, and to make it as clear and simple as possible."

—Brian Simmons

As coke is deposited in the drum, the drum becomes full and the hot mixture from the furnace must be diverted to a second drum. While the second drum is filling, the filled drum is cooled down, first with steam and then with quench water. "Hot coke will auto-ignite if it ever comes into contact with air," Simmons says. "So keeping the air out while the coke is being cooled is vital to the safety of the people operating the refinery." After the coke has cooled down, the top and bottom lid of the full coke drum are removed, and the solid petroleum coke drops onto a concrete pad. To aid gravity, a high-pressure water blaster is deployed to dislodge any coke from the drum.

It is vital that the drum valves are opened and closed only when it is safe to do so. There could be a very large fire if someone opens the drum when the coke is hot. There could be a risk of an explosion if someone opens the quench water valves too soon. Double block valves are used to ensure that the toxic hot gas from the filling drum does not leak into the drum, which has been opened for emptying. Premature closure of a valve could dead-end the flow of heated resid from the furnace and cause furnace pipes to burst.

This is a day and night, 24-hours-a-day, seven-days-a-week operation, under all weather conditions. To assist the operators so they don't overlook any of the many rules associated with each step of the drum filling and emptying sequence, a computer-controlled permissive system is used to monitor valve opening and closure.

The customer knows

The panels provided by Simmons' and the Severe Service Applications Group help make that whole process run as efficiently and safely as possible. Creating such a system begins and ends with the customer, Simmons explains.

"The customer has to give us detailed specifications of exactly what he wants the system to do. We then work with the team members to figure out how to make it happen, and to make it as clear and simple as possible," Simmons explains. The panels, push-button screens, monitors, and wiring that make up the system also have to be extremely robust because they are operating in facilities that have very challenging conditions, including extremely high temperatures and a lot of grime. At the same time, the systems have to be able to operate for decades.

Velan subcontractor Daniel Gagné testing the computer's touch screen.

"We build a Programmable Logic Controller-based system that can run the entire valve network on a 24/7 basis with mirror-technology backup systems to ensure the system is never down, regardless of the very rough conditions inherent in the refining process," Simmons explains.

"We work with Daniel Gagné, Director of Engineering, at our sub-contract facilities on this because he and his team are very familiar with the process of building these types of units and preparing the electrical drawings—that's their specialty," he adds.

"These panels and touch screens driving these control systems are like Hummer vehicles. They're built with stainless-steel and other materials that can be cleaned easily and can take some hard use without experiencing performance problems," Simmons explains.

Once the system is designed and built, it goes into an extensive testing mode that can last for weeks. Velan's project with this particular refinery, which is one of the largest in India, is currently in the testing stages, and two engineers from the company, the Operation General Manager and Instrumentation General Manager, came to the Montreal lab to help put the system through its paces. Once this is done, the control system is disassembled and carefully packed for transport to the refinery. Onsite, it is again carefully reassembled and put through another extensive system check that can take two or three weeks. Then it's all systems go.

Main challenges

The control system for this six-drum coker unit involves over 100 motor-operated valves and 30 push-button panels. The computer system needs to monitor 1,200 input signals from the coker deck and 300 input signals from the central control room, and send 800 output signals back to the coker deck and 400 output signals back to the central control room. It needs to verify 2,000 possible maintenance problems and repeat all these operations at least 10 times every second.

Brian Simmons, Manager of Velan's Severe Service Applications Group, strategizing on the project with Vera Tobalian, Senior Corporate Expeditor.

There are three touch screens mounted on the coker deck to provide the operators with process information, and one touch screen in the computer room to provide maintenance staff with system diagnostic information. There is a dedicated remote computer logging the changes to every signal should the client need forensic reports.

Despite the significant technology involved, Simmons says the main challenge of this project is dealing with the fact the whole system is operating in a different country with its own culture and way of doing things, as well as its own standards on such rudimentary things as the thicknesses and color-coding of electrical wires.

"We start with pages and pages of rules that come from the customer, and we have to understand why those rules are made and the obvious logic behind them—which is where our expertise in the refining process comes in. And then our job is to take these extremely detailed specifications and make sure they are very simple to operate so the operator in the field doesn't have to think, just react. The systems themselves are designed like highway road signs—when the red light is on, a valve is closed. When the operator wants to open it he pushes the green button and a green flashing light will confirm the valve is moving; every operator command has a confirmatory response," Simmons explains.

It takes teamwork

Although Simmons heads this project, he is working with an entire team including Hicham Guessous Doss, Engineer, Electrical Control Systems; Vera Tobalian, Senior Corporate Expeditor; Edinyie Essien, Application Engineer; Edward Rzeszutek, Application Engineer; and Mike Jacobs, Design Manager, Severe Service Ball Valves.

"Supplying both the equipment and integrating the equipment control system into the customer's facility reflects Velan's position as a leading engineered solutions company. We not only have engineering experts capable of specialized designing in mechanical, instrument, and process disciplines, we also have a track record of successful implementation involving shop trades, factory testing, site commissioning, and on-going maintenance support. The team of people we have are veterans in the industry and represent an accumulation of hundreds of years of experience. We offer the customer the benefit of combining in one turn-key package the skills of Velan as a valve builder, an actuation expert, and a control system fabricator. Because we work with a broad range of clients, we can offer our customers solutions derived from consideration of many different approaches," Simmons says.

He also says that going forward, such projects represent new opportunities for Velan.

"As we all know, some forms of technology are getting less and less expensive over time. For example, we couldn't have put together as complex a control system as this one a decade ago for such a competitive price: it would have cost almost as much as the highly engineered valves themselves. However, today, companies are looking to put in systems that can be expanded and improved piece by piece to automate such mission-critical processes," Simmons says. "For those that work in the facilities, that's good news because it means their jobs will get safer," he adds. And that's especially important since coker units today process a resid known in the trade as "bottom of the barrel," in which the crude stock has more sulfur and metal content than ever before, which means it's also more corrosive or erosive to piping systems and valves and everything else in the process than ever before," Simmons says.

Velan delayed coker valves are now installed in over 165 coker units in 28 countries. Velan has supplied over 800 control panels to refineries around the world.

"At Velan, we know the hardware that goes into the refining process very well because we have more than 25 years' worth of experience supplying to this industry. In fact, we're leaders in supplying these particular types of valves to the world," Simmons explains. **|VV|**

Process-oriented. Tech savvy.

A day in the life of Stephen Cherlet, Executive VP, Operations

When you have 250 staff who report to you and another 600 unionized team members you need to keep in touch with, the challenges of your job begin before you ever sit at a desk.

Just ask Stephen Cherlet, who was hired back to the Velan fold six years ago as the person in charge of running operations for six of Velan's facilities in four cities and three countries.

"Like many people in today's corporate world, I find it easy to get trapped in an office answering emails," Cherlet says. But making Velan employees comfortable approaching him directly with problems is a top priority for him. To answer that tremendous challenge, instead of replying by email he goes to see a person directly if he's in the same building or calls them if they are on another site. He also tries to visit the North American sites he's responsible for on a regular basis, traveling to Granby from the Montreal headquarters at least weekly and to Williston every other week.

People driven.

"While at the plants, I take a walk through the facility to see things first-hand and talk to people doing the work. Sometimes, I just stand and watch what's happening on-site for five or ten minutes. That short time can be very instructive in terms of seeing and understanding an issue or difficulty," Cherlet says.

The right teams in place

Keeping in touch with employees is critical to Cherlet in his current position because he firmly believes the success of Velan can be pinpointed to one major factor: teamwork. In each area under his supervision, he points to a team of employees that makes that part of the operation run smoothly.

For example, in information technology, a critical area in today's world, he says Velan has been able to successfully implement its enterprise resource planning (ERP) platform because of the people behind the implementation.

"From a purely operational perspective, having the majority of our operations on a global ERP is a huge benefit. It allows us to standardize business processes and data across multiple organizations," he points out. The timeliness and availability of data in such a process means the company can see key performance metrics across a global range that allows the company to operate with its eyes wide open, comparing trends in bookings, billings, backlog, inventory against specific customers, countries, products, and more.

Such wide-reaching transparency could not be achieved, however, without the right people in place.

"Velan has a great cross-functional team that has helped with this deployment. People from Sales, Finance, Operations, and IT have contributed to the current success," he says.

This enterprise-wide effort is one of the significant changes Cherlet has witnessed over the years. He was first hired by Velan in 1992 and served as Vice President, Supply Chain and Information Technology, for eight years before striking out on his own for five years. He was hired back in 2004 to his current position partly because of his knowledge of IT, but also because of his broad background in operations and obvious knowledge of the company.

"From a purely operational perspective, having the majority of our operations on a global ERP is a huge benefit. It allows us to standardize business processes and data across multiple organizations."

— Stephen Cherlet

The 4,200-square-meter (45,000-square-foot) expansion of Plant 5 and the new 6,000-square-meter (65,000-square-foot) facility adjacent to the expansion.

Cherlet recently completed the third level toward a Master Certificate in Six Sigma from Villanova University, a major manufacturing processes program based on quality management and best practices methods. He is currently putting the theory and philosophy into place with Velan.

As far as what he's seen change over the years in IT: "In 1992, when I first came to the company, we had 12 personal computers in the entire company," Cherlet explains. By the time he left in 2000, there were about 350 personal computers in place, email was used, various desktop software packages ran office functions, and the company was being interconnected within the North America plants, but by high-speed phone lines.

> ***"Leadership is being able to get people to do what you want because THEY want to do it. I succeed through other people's efforts. My goal is to build a good team, provide them with vision, motivate them to obtain key goals, and ensure they have the resources to succeed."***
> **— Stephen Cherlet**

Today, Velan has a backbone run by enterprise-class equipment with all computers linked to the network, which is run over Velan's own fiber optic link between primary and secondary servers that operate the company in real time. There are over 450 personal computers and 30 handheld wireless bar-code data collection devices in North America alone.

Changes in operations and processes

Cherlet has also seen many positive enterprise-wide changes in operations and processes within the company.

In the last few years, for example, one of the most significant operational improvements Cherlet says he's seen within the company was the establishment of a Canadian distribution center at the Granby, Quebec, facility.

"Our goal was to aggregate all our stock of finished valves into one location so we can offer more products to more customers in a faster way," he says. Currently, wafer checks, knife gates, small forged, and bonnetless valves have made the transition and more products will be added in the coming months.

The result is "we can pick, pack, and ship faster since we have a team dedicated to this function," Cherlet explains. This results in major reductions in freight costs because more products can be shipped together at once.

Another major change he's witnessed was the 4,200-square-meter (45,000-square-foot) expansion of Plant 5 and the construction of the new 6,000-square-meter (65,000-square-foot) facility adjacent to the expansion.

Because of the plant, Cherlet was able to see some of what he's learned about "lean" practices put into place. This practice focuses on increasing efficiency and decreasing waste, and using empirical methods to decide what matters and is valuable to a company and its customers and partners, rather than accepting pre-existing ideas of what's important.

As he explains, "One of our lean coordinators was dedicated full time for almost a year to optimizing the floor plans," he says, an effort that resulted in the current "u" shape design, which maximizes the efficiency of the plant.

A third area that Cherlet has seen expanded in his years at Velan is employee safety, an area of priority for him.

He hired the first full-time Health Safety Environment employee in 2008 and the Velan team working in this area is implementing a company-wide risk assessment and remediation program with a focus on machine safety. Velan North America is well on its way towards international certification (OHSAS 18000/ISO 14001) in this area, and he's seen the health/safety team get both Partner-In-Protection and Customs-Trade-Partnership-Against-Terrorism certification since he rejoined the staff. All of these programs have significantly improved the physical security of plants and raised awareness among employees.

The challenges of a large company

Being in charge of such a large operation definitely has its challenges, some of which are inevitably created by external pressures and trends.

One major challenge is a trend affecting most industrial companies these days, and that's keeping up with the aging workforce.

"Our company has many long-time employees with skills sets developed over many years of this company's 60-year history. That's a blessing in that we've developed a reputation for expertise," Cherlet says. But when experienced management begins to retire, it creates a void. Velan is addressing that now through a combination of promoting from within and hiring from outside.

Eating the elephant

When Stephen Cherlet is asked how he personally handles such a diverse range of challenges, he jokes that "it's like eating an elephant. You have to do it one slice at a time or you'll choke."

He could not do any of it, however, without having those teams in place, he adds.

"Leadership is being able to get people to do what you want because THEY want to do it. I succeed through other people's efforts. My goal is to build a good team, provide them with vision, motivate them to obtain key goals, and ensure they have the resources to succeed," he concludes. **|V V|**

Valve shipments up

Valve shipments out of U.S. facilities will rise about 1.5% in 2011 to $3.91 billion from about $3.85 billion for 2010, according to the Valve Manufacturers Association (VMA). That's good news in itself since it's the second year in a row to see increases. But the really good news is that the industry is already nearing where it was at its 10-year peak in 2008 of about $4 billion—after falling during the recession.

"Early in the decade, we saw bigger increases year over year. However, the fact the industry has been able to maintain steady momentum during a very difficult economic period and is now almost where it was at its highest illustrates the strength of our industry," according to William Sandler, CAE, VMA President. VMA's figures and comments are part of the annual valve shipment forecast by the association.

According to Sandler and VMA, the valve industry, which lags behind the general economy, saw its biggest drop in 2009 when shipments fell by 5% to $3.8 billion. "However, we predicted this would happen and shipments have been rising steadily since that year," he added.

One reason the industry has fared well has been that exports have risen steadily over the last 10 years—the decade started out with about $530 million in exports and stood at almost $751 million by 2010. VMA predicts exports will rise to $760 million for 2011.

According to VMA, the projected growth in valve shipments will occur across the entire range of end users. Of the 15 markets the association tracks, water and wastewater will have the largest share in 2011 at about 18%, while chemical will hold about 17% of the market, petroleum production and petroleum refining each will have about 12%, and power generation will have 11%.

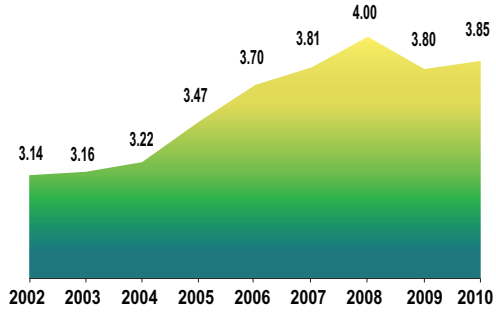
"That hasn't changed much over the decade except that chemical and a few smaller markets—such as pulp and paper, commercial construction and co-generation—have lost market shares while water and wastewater and the industries based on petroleum and gas have gained slightly," Sandler commented.

Going forward, experts generally agree that what happens in the Middle East may affect crude oil prices and could derail the recovery that has occurred in that segment if prices continue to increase. As far as the other industries, they are affected more and more by the global picture.

Michael Halloran, Senior Research Analyst/Vice President at Robert W. Baird & Co., Milwaukee, WI, told a VMA leadership conference early this year that the chemical production industry is migrating away from North America and Western Europe toward emerging markets and the Middle East.

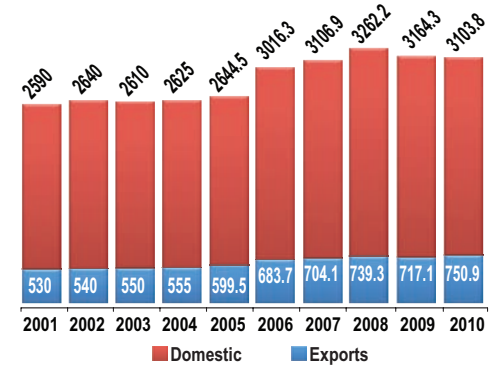
He also pointed out that while the water and wastewater market was not immune to the recession, it will grow worldwide at a compound annual growth rate of 6%–8% going forward, driven by population growth, rising living standards, industrialization, and disrepair of existing water systems.

Total industrial valve shipments 2002-2010
$ billions



Domestic shipments reached a peak in 2008, fell in 2009, but were climbing back up toward that high by 2010.

Proportion of exports in total shipments
in $ millions



While domestic shipments have grown only slightly over the past 10 years, exports have risen, especially in the last five years.

Valve types

As far as types of valves being shipped in the U.S., automated valves continue to gain ground—they hold the largest share among valve types at $1.2 billion in shipments, followed by ball valves at $706 million and gate, globe, and check valves at $567 million.

For more details, go to ValveMagazine.com and look for the article entitled, "2011 Valve Shipment Forecast." **|V V|**

Going big with cokers

One area that keeps the R&D teams on their toes these days is the increasing need for severe service valves—those stalwart pieces of equipment that must face extremes in temperature and pressure, or must answer brand new challenges brought on by the ever-expanding, ever-more-complicated world of industrial processes.

Take the delayed coking process for example. Recently, Velan produced its first 18-inch coker switch valve and an even larger overhead vapor ball valve—36 inches in size. The valves were sold to engineering company Chiyoda, a firm Velan has been working with for many years (see the first issue of *Velan View*).

Trending to larger sizes

According to those who have worked on the valves for the Chiyoda coker project, "The basic design has not significantly changed from previous versions, except for the fact that the sizes reflect a current trend in the industry, which is toward designing and manufacturing bigger and bigger valves," explains Edward Rzeszutek, Applications Engineer in Velan's Severe Service Applications Group. Rzeszutek, who has been with the company nine years, specializes in coker valves.

These particular valves are for the Jubail Export Refinery, a new refinery in Saudi Arabia owned by giants Aramco Oil and Total Oil, which will process 400,000 barrels a day of Arabian heavy-grade crude oil. Chiyoda was commissioned for the engineering portion of the job, while Conoco supplied the delayed coker technology to the delayed coker unit (DCU).

Velan's R&D teams touch every aspect of the company and its end-user clients from the chemical industry to mining to oil and gas.

Edward Rzeszutek, Applications Engineer in the Severe Service Applications Group.

Getting the most out of the process

According to Rzeszutek, DCUs are being used with increasing frequency around the world. As he explains, "The role of DCUs is to take the residual oil feed to its thermal cracking temperature to generate gas oil and lighter components."

They do this essentially to extract more products from the waste of the main process. Since this extraction maximizes the yield, DCUs are considered to be sustainable profit centers for the refineries. Velan's valves will be used in strategic areas of the plant, diverting and isolating the flow between two coker drums that are a main component of this DCU.

"In the delayed coking process, there is always one drum operating while the other is down for solid coke reclamation," Rzeszutek explains. The Jubail Export Refinery's DCU will actually have three pairs of drums, and "the 18" switch valve that Velan produced for the project is a four-way ball valve that is the heart of the process," Rzeszutek explains.

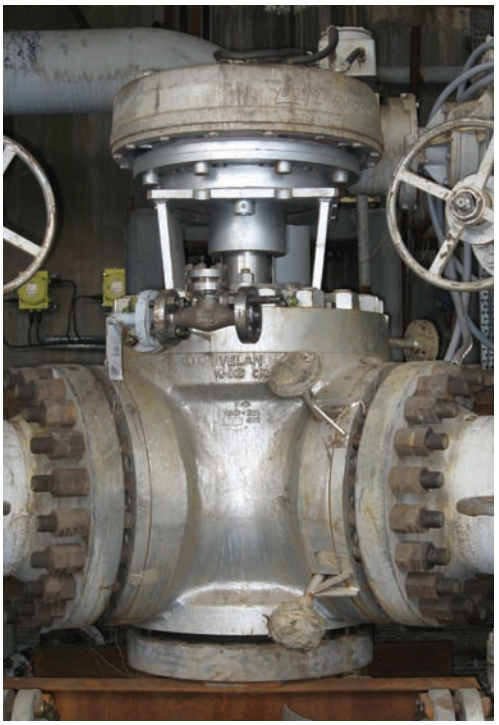
Velan was selected to provide this vital valve because of its reputation for experience in the coker process, an area of business where Rzeszutek and Jose del Buey, VP Severe Service Applications Group, focus much of their time.

"In the last decade and a half, Velan has garnered the lion's share of the sales in this market," Rzeszutek says.

Best-of-plant valves

Because Velan has been doing good work in the coker industry for so many years, it has built a solid reputation. Beyond the types of valves used in the Jubail Refinery, the company is also producing other types of valves that go into the process, such as the isolation and steam-purged gate valves, as well as the high-pressure (class 1500-2500) metal-seated ball valves for water-cutting decoke systems, which are designed to seal against a highly erosive and corrosive media.

Velan also manufactures a ring valve under exclusive license from the inventor Mr. Peter Kindersley of EVI Inc. that is designed for



Velan is the only company to date to supply a class 900 16" (400 mm) four-way switch valve to a delayed coker installation.

flow control applications in delayed coking. This unique patented design provides substantial operating economy for the refineries, a direct advantage of Velan's building close relationships with end users and licensors to ensure an understanding of both their process and operating issues.

It's all about control

The coker business has also contributed to another company trend.

"An interesting offshoot of our efforts in coker projects has been the formation of a small group within our department that handles the complex job of automating and interlocking the functioning of these critical valves," del Buey explains. "We have now supplied several control systems and have met with great success in this growth area."

Of course, any business line has its own special challenges. For example, to make the 36" valve required new ways of thinking both from the engineering and the general logistics perspective.

"The main engineering challenge was handling the very heavy weights of the parts —the whole valve weighs about eight tons. "When it came to assembling, our Plant 2 is already capable of handling these weights, but any service shops that may become involved have to employ multiple cranes or crane and truck combinations to lift such heavy valves," says Mike Jacobs, Design Manager, Severe Service Ball Valves.

A job well done

It is just those sorts of challenges, however, that give Rzeszutek, del Buey, Jacobs, and the severe service team the jolt of stimulation that keeps their jobs exciting.

"What I find very rewarding in working with coker valves and in the severe service division is that you are selling a product that is specifically designed to meet new challenges—you are not adapting a product for the service, but rather taking the service, understanding its unique problems and issues, and designing a customized valve for it," Rzeszutek explains.

> ***"We have innovated the process in many ways so we are basically becoming a partner-in-expertise to the people who run refineries."***
>
> **— Edward Rzeszutek**

He also finds the coker aspect exciting because of the reputation Velan has developed over the years.

"We have innovated the process in many ways so we are basically becoming a partner-in-expertise to the people who run refineries. They are coming to us for advice because we have gained so much experience—it's a sharing of information that is truly rewarding in itself," he says. **|V V|**

Did you know?

Velan has supplied valves to 95 of the most recent 100 major delayed coker projects worldwide.

At Velan, we know what it takes

to design and manufacture industry-leading valves that stand the test of time.

After all, we've been doing just that for over sixty years.

We offer a wide range of valves designed to meet any industrial application. So next time you're in the market for a high-pressure, high-temperature valve that delivers unparalleled performance in a variety of demanding applications, you can rely on our pressure seal valves.

When it comes to valves that offer low emissions, easy maintenance, and long and reliable service, Velan is the name to trust.

Velan. Quality that lasts.

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