

THE TECHNOLOGY AND PEOPLE AT LEINE & LINDE

# Impulse

No. 1 2011

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# Development on broad front

**A LOT WILL BE HAPPENING AT** Leine & Linde in the coming months. Thanks to the efforts of our innovation department, a whole host of new and exciting products will be launched during the autumn. Something we are especially pleased about is the fact that we already know that the products have the right properties, as they have been developed in close cooperation with market-leading players in each field. This creates ideal conditions for continued success here at Leine & Linde and at our customers' companies. Our global expansion is continuing alongside investment in product development.

We have already launched successful initiatives in China, Korea and India and are now turning our attention westwards. Not just to the USA and Canada, but also South America, where there is increasing demand for our products, and we are channelling resources into developing a regional presence.

**EXPANSION HITS** home. We have outgrown our premises and are looking to expand our production capacity at Strängnäs. During the spring we acquired a new building and land adjacent to our current production facility. This purchase safeguards our future growth. The new building will also be home to the new employees who will be joining us shortly. New jobs will be created as a result of our market expansion, including engineering posts and other specialist roles.

Several other posts will also be created which will enable us to achieve our common objectives and also continue providing our customers with the best possible service.

Strängnäs, May 2011  
Björn Zetterlund  
CEO of Leine & Linde



Photo: Scaniapix

Refuse lorries often use CANopen for internal communication.

## LEINE & LINDE MASTERS CAN

**A field bus interface ensures that sensors, such as encoders, and other components can communicate with one another and main control systems. CANopen is one of the most common interfaces.**

**INTERFACES** When you get into a lift or see a wind farm, you can be sure that some form of CAN-based interface is being used for internal communication. CANopen is one of the most robust field bus interfaces on the market. It exists in several forms, including DeviceNet, CAN Kingdom and J1939.

CAN started out as a European research project at Bosch. CANopen, which defines the higher layers in the OSI model, came later. The specifications for CANopen were eventually transferred to the nonprofit organisation CAN in Automation (CiA). CiA comprises international users and representatives from various manufacturers' groups and aims to develop and maintain the interface.

### Certified components

Over the years the original 60-page specification has been supplemented with additional communication services and optimised. Furthermore, many

general and application-specific profiles have been developed by CiA in consultation with various interest groups. The overall aim is to adapt functions to suit industry-specific applications such as refuse lorries, lifts and mobile machinery.

Leine & Linde launched its first CAN product more than 15 years ago and has been producing customised and general products based on a variety of CAN interfaces ever since. The robustness, flexibility and scalability of the interface are all features that have been praised by system builders.

As CAN is a standardised interface, interoperability between various component manufacturers is guaranteed, provided the components have been certified. Leine & Linde's products have, of course, been certified – a process that guarantees hassle-free use and interoperability for automation systems based on CANopen. ■



# The Indian company

**INDIA** For a non-Indian company to succeed in India it has to assume a local identity. That is why Leine & Linde has established a subsidiary in New Delhi.

Leine & Linde originally followed its global key customers to India, although it soon became apparent that the domestic Indian market was sufficiently large to justify strengthening the company's local presence.

The Indian economy is growing at an incredible rate. India is the world's fourth largest economy, offering incredible business opportunities.

"Doing business with Indian companies is easier if you represent an Indian company," says Somnath Mukherjee, a sales manager at Leine & Linde. "It pays to have your finger on the pulse, to know what is happening, and to have a local presence."

Customs procedures, for example, can be a minefield.

It can be difficult in India to import products and to pay invoices in a foreign currency – a process that makes



"It is important to have a local presence," says Somnath Mukherjee, Sales Manager at Leine & Linde in India.

even seasoned businessmen sweat. An Indian company, on the other hand, can establish contact with customs officials, while invoices can be paid in Indian rupees. It simplifies the whole process and ensures good service.

Both Somnath Mukherjee and his colleague Abhishek Shrivastava are qualified engineers. Their job is to work as closely as possible with customers, providing technical solutions and com-



Photo: Scantix

mercial support. And it's going well. "Despite intense competition, sales are steadily increasing," says Somnath.

He wants to emphasise the fact that several major Indian OEM customers have opted to use Leine & Linde's encoders.

"Naturally this is because of the flexibility and level of service on offer. Without that, we would just be another producer." ■

## FACTS ABOUT INDIA

Population: 1.2 billion

GNP/capita: USD 3,100 (Sweden: USD 37,000)

India is the world's fourth largest economy after the USA, China and Japan.

## ADAPTED FOR DRIVECLIQ

**CUSTOMISATION** Siemens is one of the world's largest manufacturers of automation and drive systems. With this in mind, continuous adaptation of Leine & Linde's encoders for use in Siemens environments seems a sensible course of action. The com-



Anders Lindström is involved in configuration and development work for Drivecliq at Leine & Linde.

munications interface Drivecliq is an Ethernet-based protocol for connection of incremental and absolute encoders. A lot of installations around the world are already based on Drivecliq, and the latest Sinamics series of frequency converters also supports this interface.

That Leine & Linde's encoders should be compatible with such systems is a given.

"It all began when a customer asked whether our 800-series encoders would work with Sinamics converters and Drivecliq. This enquiry prompted us to adapt the encoder series to the new Siemens environment. The results were excellent and we can now say that we have good knowledge of Drivecliq," says Anders Lindström, who contributed to the configuration and development work.

"We can provide technical assistance in connection with commission-

ing of Drivecliq systems and integration of our encoder. Obviously, we constantly adapt our products to ensure that they work with systems from Siemens and other producers. Our aim is to cement our position as a complete supplier of encoders for industrial applications."

The current solution for connecting an encoder from Leine & Linde to a Drivecliq system is using a SIEMENS interface converter known as SMC 20. Encoders with 1Vpp or absolute encoders with EnDat or SSI interfaces can be connected to this. This enables the benefits of the Drivecliq interface to be exploited in communication with the encoder. ■



The robust 800-series encoders work incredibly well with Sinamics converters and Drivecliq communication.

## LEINE & LINDE'S PRODUCTS CERTIFIED BY TÜV

Leine & Linde's products have to comply with international standards as a matter of course. Certification in accordance with IEC 61010-1 simplifies this work.

**CERTIFICATION** Leine & Linde's products have now been type-approved by Technischer Überwachungsverein (TÜV), a recognised certification body. There are stringent requirements that must be satisfied to obtain this approval (TÜV geprüft), which has become one of the strongest international quality marks.

Standard IEC 61010-1 is entitled "Safety requirements for electrical equipment for measurement, control and laboratory use". Companies that do not fulfil these requirements find it difficult to market electronic products in Europe. IEC 61010-1 has been issued by the International Electrotechnical Commission – an international organisation founded in 1906. Practically all countries are members of the organisation, which means its standards are widely accepted.

Many countries outside of Europe have also established their own standards for electrical safety based

on IEC 61010-1, with local additions. The USA has UL, China uses CCC, and Russia has GOST. As a producer, being awarded IEC certification in accordance with IEC 61010-1 simplifies work to certify products for local markets, ensuring that they satisfy local requirements.

Leine & Linde has, as the first step in its local adaptation process, chosen to certify encoders in accordance with the specific requirements for the North America market defined in UL (UL 61010-1:2001 and CAN/CSA-C22.2 No. 61010-1:2004).

In order to show that electrical equipment fulfils a standard it must be certified. TÜV type-tests the product, reviews associated documentation and verifies that the business is able to implement repetitive production of the type-approved design. Only when all these conditions have been satisfied is the certificate issued. ■

Anna Granlind, Quality Manager, responsible for certification of Leine & Linde's products.



Photo: Furrillo



Pierre Traut is a co-owner of ICA Systèmes Motion, Leine & Linde's new French distributor.

## NEW DISTRIBUTOR IN FRANCE

High level of technical competence combined with good business skills. These are characteristics associated with ICA Systèmes Motion, Leine & Linde's new French distributor.

**FRANCE** Pierre Traut is one of the co-owners of modern company ICA Systèmes Motion. ICA is not solely a distributor of technical products, but also a company that works with its customers to develop high performance solutions.

"Leine & Linde has long been known as a manufacturer of reliable products for demanding applications. It is my opinion that Leine & Linde's encoders are an excellent complement to ICA's own product portfolio. Products from ICA's other agents are used in similar environments to Leine & Linde's encoders. We can therefore achieve synergies which simplify everyday work for our customers."

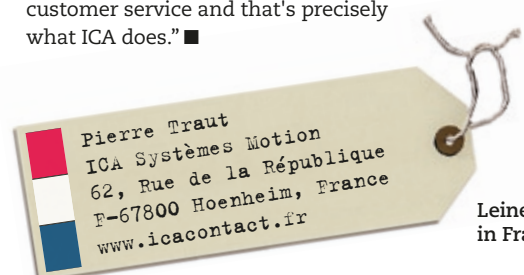
### Spreading the word

Pierre Traut is convinced that ICA will contribute to growth at Leine & Linde, but first the company needs to become a more familiar name.

"That's not a problem in terms of the major motor manufacturers, for example, Siemens and ABB. They are already familiar with the company and associate Leine & Linde with quality products. Our task is to make French companies more aware of Leine & Linde and its offering."

Bruno Anfossi agrees. Bruno is Sales Manager for Southern Europe, based in Milan.

"It is important to offer competent customer service and that's precisely what ICA does." ■



Leine & Linde in France



# Focus on China's wind power industry

David is Leine&Linde's man in China. He leads a team of six that has wasted no time in making China Leine&Linde's largest market.

**CHINA** David is not actually his real name, that's XiongWei He. But as Chinese culture teaches people to help others, XiongWei chose to assume a European alias.

Leine & Linde has established a team in Shanghai with continued expansion in mind.

"The situation has progressed rapidly since the office was set up in 2005, and we quickly outgrew our original premises," explains David. He sees great potential on the Chinese market, thanks largely to China's enormous expansion of its wind power industry.

At the end of 2010 China overtook the USA as the world's largest wind power nation, and it doesn't stop there. More wind power plants are commissioned every day in China to satisfy its enormous energy demands.

According to current plans, wind power production is expected to increase five-fold over the next 10 years.

Wind turbine blades are able to swivel to maximise power output based on prevailing wind conditions. Encoders measure the absolute blade angle position and send the data to the control system. Encoders are also often used to ascertain the direction in which the turbine tower is facing. The tower needs to follow the wind, meaning there is a need for feedback.

Sweden is mentioned a lot in China now that Volvo is part of a Chinese group that is preparing to build Volvo factories in the country.

"Volvo is a quality car. Swedish quality is mentioned almost daily in the media, which is free advertising as far as we're concerned," says David. ■



XiongWei He, alias David, can benefit from publicity surrounding Volvo in China. Leine & Linde's reputation for quality is as good as Volvo's.



Wind farm on a mountain top close to the city of Xianing in Hubei Province. China is already the world's largest wind power nation and it aims to increase production five-fold over the next 10 years.



# EXTREME DEMANDS AT STEELWORKS

Extreme 1000 series. That is the name of the latest range of encoders to come out of the development department in Strängnäs. And they certainly live up to their name.



**FOR SOME CONSIDERABLE TIME IT WAS**

the well-known 800 series that set the standard for steelwork encoders. However, the extreme conditions, e.g. dust, vibrations, shocks, high temperatures and aggressive chemicals, called for a solution that was even more robust. Leine & Linde's engineers got straight onto the problem, and the result was a brand new range of encoders: Extreme 1000 series – an encoder designed for use in the most exposed parts of a steelworks.

The 1000 series made its debut at the 2009 SPS trade fair in Nuremberg. Since then, this product has found its way into numerous steelworks around the world. There are a number of mechanical and electrical variants. Encoders can, of course, be purely incremental for use in providing feedback on speed. In addition, the 1000 series can also be manufactured as a redundant incremental or absolute encoder or to provide a combination of incremental and absolute functions.

**Powerful machinery**

As Leine & Linde is a company that always listens to its customers, the first variant to be built was a customised version. The application called for it to monitor the speed of a main motor at a hot-rolling mill. Such motors are the heart of any steelworks and often have a power rating of several megawatts. Powerful machinery is involved, and the motors are extremely expensive, so breakdowns caused by a faulty motor have to be avoided at all costs. If you are unlucky, a damaged encoder can cause a motor to break down – an expensive problem to fix. Very expensive in fact. It quickly

**INCREMENTAL & ABSOLUTE**

An incremental encoder measures the speed of rotation for speed feedback.

An absolute encoder monitors position, often the motor's stator position in large synchronous machines.

**“A SMELTING FURNACE CONTAINING 1,500°C STEEL IS AN ENVIRONMENT WITH EXTREME DEMANDS”**

became apparent that the 1000 series functioned well in this extreme environment.

Bruno Anfossi is Leine & Linde's Sales Manager for Southern Europe, based in Milan, Italy. Bruno has worked alongside customers on the installation of a large number of 1000-series encoders. His experience and skills make him a very popular man.

“One steelworks in Italy needed a variant of the 1000 series comprising two independent incremental outputs, while the control system needed to know the exact position of the motor stator. We resolved this by integrating an absolute encoder into the product. It was a large synchronous motor with a power rating of several megawatts, which suddenly made our largest encoder series in physical terms look very small,” he explains. “We sat down with the customer to discuss the type of mechanical assembly required. We were there during commissioning of the motor and we verified its function. That's how we work: in close cooperation with the customer and his business.”

**Minimises the risks**

Bruno has yet more examples to offer.

“On another occasion we linked a number of 1000-series encoders together in a PROFIBUS network. The application involved positioning a tilting smelting furnace containing 1,500°C steel. It was an environment with extreme demands. Another steelworks in Mexico decided to use our 1000-series encoders for particu-



Bruno Anfossi specialises in tough environments.

larly sensitive applications, where the effects of a malfunction would be so great that the customer absolutely did not want it to happen. They had been let down badly by products from other manufacturers and were actively seeking a more robust alternative. You could say that our encoder has helped to minimise the risks.”

“The customer was relying on the fact that our 1000-series encoders would be the best solution, and they have achieved full production since the encoder was installed,” says Bruno.

“I would just like to say that the 1000 series is 'proven in use'. This has been confirmed by our own internal verification processes and a great many customer systems around the world. So when do I recommend to customers that they use a 1000-series product? That's easy. When the customer wants to eliminate risk and avoid stoppages, of course!” ■



THE 1000 SERIES Encoders for extreme environments.

# DEVELOPMENT A PR

Leine & Linde is investing heavily in technical development. The development department is growing rapidly and the aim is for the company to become an important systems supplier to industry.

**PETER KJELLKVIST** is responsible for a strategically important division at Leine & Linde. He is the company's R&D manager and it is his responsibility to ensure that we are at the forefront of development. Two years ago the department comprised eight people, now there are 14, with more to come.

"We need additional skilled engineers," says Peter.

Under his guidance a new division has been set up called Research & Innovation. This team is charged with thinking more freely and in broader terms than is normally the case. Team members are expected to work on innovations and to research new business opportunities that

support the company's long-term growth.

### Example: Optolink

One customer problem was origin. The signals from an encoder in a port crane were experiencing interference on their way from the electrical motor at the top of the crane to the frequency converter on the ground. With port cranes signals often have to travel a considerable distance and electromagnetic interference can be a problem.

Would an optical fibre solution eliminate the problem? A period of concept development indicated that the idea would work. The solution, called Optolink, is now a successful product.

The next step was adapting the solution for other industries, with the wind power industry top of the list. Here, encoders are used to monitor the direction of the blades and the speed at which they rotate. The signal transfer environment is far from ideal, making Optolink a natural alternative. An innovation that sprang from a problem affecting port cranes now helps wind farms to produce renewable energy.

"This is a textbook example of a great result," says Peter Kjellkvist, who is convinced that more examples are on the way.

"Our sales team and engineers are our eyes and ears on the market. They are our business development consultants.

Peter Kjellkvist is R&D Manager at Leine & Linde. He set up the Research & Innovation division to enable the company to think ahead.

**"IF WE CAN HELP THE CUSTOMER TO MAKE MONEY, THEN WE TOO WILL BE SUCCESSFUL."**



**NAME:** Peter Kjellkvist

**QUALIFICATIONS:** PhD in drive systems

**LIVES:** Out in the countryside at Mölnbo

**FAMILY:** Wife, 3 sons, and a few dogs



# ORITY

## 'Go to Gemba' to see the problem

Peter believes that direct contact with the customer is vital. If there are too many links in the chain when dealing with a problem, the process becomes a game of Chinese whispers. One person whispers the problem to another, who in turn whispers it to the next person, and so on. After a while the message has completely changed.

"That is why we try to send an engineer out to investigate the problem first-hand. This approach is considered an element in the 'lean product development' concept. Looking for an answer at the source of the problem, or 'Go to Gemba' as it used to be called, is an important success factor for us."

Peter sums up his views on development activities in one sentence: "We will work on developing new solutions that lead to increased customer value, without losing sight of the encoder business."

## From components to systems

There is another aspect, however, to this idea, which involves Leine & Linde developing from being solely a component company to becoming a systems supplier. The process is actually quite a short one.

"We already have our encoders, so all we need do is add some optic fibre and link it to the customer's control room. Then we will have delivered a system. This is an activity ripe for expansion that could lead to greater commitment and increased interaction with our customers," explains Peter.

The ultimate goal is to be able to set an industry standard in certain areas. The opportunities are there. "As we are a relatively small organisation with open communication we

may hit upon something in one area which could be applied in others. This makes development work efficient and saves a lot of time. The most important thing of all though is, of course, the relationship with the customer."

"If we can help the customer to make money, then we too will be successful," says Peter.

## Condition-based maintenance

Another area which Peter is interested in is developing systems for condition-based maintenance. Such a system could, for example, be used to determine the servicing needs of a paper-making machine.

"Our encoders could play a key role in this area in the future. With the appropriate peripheral equipment they could become a subsystem in a larger system for condition-based maintenance. If a component begins to show signs of wear you could just replace that component, doing away with preventive maintenance based on a specific schedule. Developing more intelligent sensors could save huge amounts of money. Development in this field is ongoing, and we are playing our part." ■

## 1,500 metres

The Optolink system can transfer a signal over more than 1,500 metres, without noticeable delay.

## SAFE TRANSFER WITH OPTOLINK

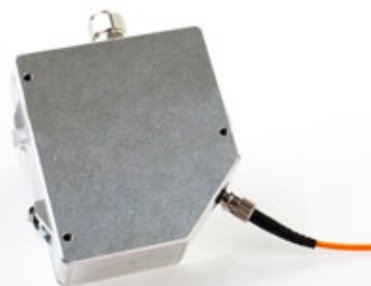
Sometimes there are long signal paths between the encoder and its receiving electronics. Wind turbines are one example, where signals have to be sent uninterrupted from the generator at the top of the turbine to the frequency converter that is sometimes located in the foundations of the wind power plant.

## TROUBLESOME ENVIRONMENT

Electromagnetic environments can be troublesome. Signal transfer using copper cable can be affected and problems can arise as a result of pulses being lost or crosstalk from other cabling. This directly affects the measurement result or speed control. Fibre-optic signal transfer has obvious benefits.

## GALVANIC INSULATION

The system suppresses not just interference from the surrounding environment but also acts as galvanic insulation between the two elements. It may thus be possible to use various 0V systems and to eliminate problems associated with potential differences in large installations.



Ex-certified equipment is required at sites where there is a high risk of explosion.

# Explosive atmosphere

In many industrial applications there is a risk of explosion. Leine & Linde's 841-series encoders are certified for use in Ex environments.

**EX ENVIRONMENTS** Explosive gases are common within the chemicals industry, oil & gas, and other fields. In other industries encoders can be surrounded by dust particles from flour, sawdust and other materials which can cause an explosion if ignited. There are, therefore, extensive rules and regulations on how electrical equipment should be designed in order to minimise the risk of explosion in such environments.

There are two important certification systems within the Ex field: ATEX and IECEx. ATEX is a European directive accepted by all EU member states. It promotes the idea that it must be possible to use an ATEX-certified product throughout the entire EU. IECEx is, on the other hand, an international certification system. The aim of this standard is

to be more generic. Certification in accordance with IECEx enables Ex products to be used in countries affiliated to the IECEx system.

## Flexible certification

If a company holds an IECEx certificate for its product, then the product only need undergo a limited inspection by a certification body in the country where the product will be used. Either the national IECEx approval is accepted straight off or an inspection is performed that is solely an administrative process to obtain local approval. The approval process is thus simplified, as there is no need to repeat type-testing or quality assessment of the product.

Leine & Linde has certified its incremental encoders in the 841 series for use in potentially explosive

environments in accordance with both ATEX and IECEx. Products in this series can therefore be used in Ex environments in most countries, not just in Europe.

Large parts of Leine & Linde's other product ranges also comply with ATEX requirements for low-risk zones (2/22), i.e. areas where gas or dust are not likely to occur.

According to ATEX, a declaration of conformity is sufficient in these instances, with the manufacturer stating that the products comply with established norms for surface temperature, degree of enclosure protection and some other technical parameters. ■

**ATEX CERTIFICATION FOR 841 SERIES:**

II 2 GD Ex d IIC T5/T6



## PROFINET- CERTIFIED ENCODER FOR POSITIONING

The 600 series comprises absolute encoders that can be used to position singleturn or multiturn movements.

**CERTIFICATION** The series was developed for industrial automation environments with high demands for precision and performance. These encoders can also be connected to various field bus interfaces, such as PROFIBUS, CAN-open or DeviceNet. During 2011 development has continued into support for the PROFINET IRT interface, resulting in certification from Comdec. Interoperability is ensured through the special encoder profile and compatibility with other PROFINET components. All this guarantees hassle-free use.

"We are one of only a few encoder producers with this certification," says Tobias Lindh, the product engineer responsible for absolute encoders at Leine & Linde.

"The fact that PROFINET IRT achieves real-time performance means it can be used for closed speed control. The delays are minimal, and PROFINET is merely the starting point for development of the industrial communication interfaces of the future," concludes Tobias. ■



Issued certificate for the 600 series with PROFINET IRT

The 600 series has up to 25-bit resolution. In total, 33,554,432 unique absolute positions per turn.

What interested you most at SPS Italia?

Leine & Linde recently took part in SPS Italia in Parma, a trade fair for industrial automation suppliers, and the ideal environment in which to show off Leine & Linde's skills. We asked our employees in Italy what they found most interesting about the event.



### Good automation products

"Italy has been without a good automation products fair for quite a few years. SPS Parma really serves an important function, and it was important for us to attend."

Bruno Anfossi (Sales Manager, Italy)



### Meeting my customers

"It was great to meet and put faces to the names of many of the customers I talk to on the phone. It's always easier to communicate with someone when you know how they look."

Federica Marchetti (Sales Coordinator)



### Making new contacts

"The fair was fantastic! It give us an opportunity to engage in new discussions with existing customers. As this was our first trade fair in Italy, we also made a lot of new contacts, which we intend to follow up on."

Gianpiero Coss (Sales Engineer)

Visit the website to see which other fairs we will be attending.

[www.leinelinde.se](http://www.leinelinde.se) >



**NAME:** Hans-Åke Hedenskog

**JOB:** Production engineer

**AGE:** 53

**LIVES:** Home in Strängnäs

**FAMILY:** Married, two stepchildren

## Hans-Åke builds 100-per cent test equipment

### **IT SHOULD BE EASY TO DO IT RIGHT!**

That is production engineer Hans-Åke Hedenskog's motto at work, where he is responsible for the production equipment used in cable manufacture and receiving inspections.

"Part of my work involves simplification and quality assurance," says Hans-Åke. "We are introducing barcodes for all parts used in the encoders. The barcodes link our customer orders to the component's job instructions and material lists. Nowadays we upload the right test sequence automatically, which significantly reduces set-up times for the operator."

Quality assurance and traceability are two other important areas to benefit from the new system.

"We want to follow the entire chain from an encoder component arriving on site to it being fitted and delivered. As the results of our automated tests are saved in internal databases, we achieve complete traceability.

"An interesting project is our updated test equipment for cabling. Things get complicated once you realise that you are dealing with a multi-conductor cable with a contact at each end. There are numerous potential combinations, but only one of them is right. A cable can comprise 17 individual conductors. That means  $2^{17}$ , i.e. 131,072 different combinations. In order to ensure that all conductors are correctly connected, a 100-per cent test of the end result is needed."

Together with his colleague Phoung Tran, a production engineer for software development, Hans-Åke has developed a system which guarantees that all cabling is delivered fault-free.

"It's fun," says Hans-Åke, who is interested in technology and electronics, and he is clearly excited about building the system.

His interest in technology spills over into his leisure time, as he is an avid amateur radio operator. His radio equipment for digital modes, among other things, enables him to chat with like-minded people around the world. It is a hobby that ties in well with his job at an increasingly global company like Leine & Linde. ■