Australian success story
Frauscher technology sets new standards

Wheel Detection Forum
Communication of high-level know-how

In-house coil winding
Quality assurance through insourcing
Frauscher supplies axle counting systems for underground lines in Beijing and Chengdou.

**Innovation**
Success for 1st Wheel Detection Forum

**In practice**
Australian success story
Perfect entry in New Zealand

**Partners**
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Dear Reader,

The number of representative and important projects relating to wheel detection and axle counting is increasing in many parts of the world, both for underground and mainline systems. Reliable systems are becoming more and more important, which is reflected in the economic development of our company.

The associated increasing interest from operators, system integrators and planners was the incentive we needed to set up an expert forum on "Wheel Detection". You will find a comprehensive article about this in this edition of our customer magazine. With more than 70 guests from 16 countries, the response was fantastic and has inspired us to organise another forum at a similarly high level in two years time.

At the same time, the current edition of "Ultimate Rail" contains lots more information about our company. As well as our Australia special, you may be interested in the articles on quality assurance through insourcing of coil production. In order to ensure that our sensors continue to achieve high quality standards in the long term, we have decided to integrate the production of our high-tech coils back into the company. Although this is more expensive, it avoids delays in production and means we can guarantee our established delivery times in this area. You can also find out more about the first order for the new Frauscher Advanced Counter FAdC axle counting systems in this edition. 79 Frauscher wheel sensors will soon be fitted to a 55 km stretch between Crewe and Shrewsbury in England.

If you have any questions or suggestions about our second edition of "Ultimate Rail", please do not hesitate to contact us.

We look forward to hearing from you!

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Michael Thiel
Throughout the world, reliable wheel detection and axle counting systems are gaining in importance. This fact encouraged Frauscher Sensortechnik GmbH to organise the first Wheel Detection Forum. This international forum of experts from the field of railway protection technology helped pass on up-to-date and well-founded knowledge on planning, operation and maintenance of signalling technology.

Over 70 international sector experts from 16 countries took this opportunity to gather information on new developments and trends in wheel detection and axle counting.

During his welcome speech, company founder Josef Frauscher made particular reference to the long-term company policy. The company’s ownership structure guarantees long-term, independent strategy. High levels of responsibility towards customers, employees and the environment are fixed company objectives. Michael Thiel, the Managing Director of Frauscher Sensortechnik, then set out Frauscher’s corporate strategy, as well as providing up-to-date information and figures on the global market for railway signalling and axle counting technology. In his speech, he explained the technical importance of wheel detection as the basis for a larger number of signalling technology applications.

The first presentation was given by company founder Josef Frauscher, who provided a detailed insight into his 30-plus years of experience in wheel sensor research. It included basic physical principles, such as how inductive proximity switches work and the difference between the RSR180 and RSR122/123 wheel sensors. He also highlighted the different challenges the company has faced over time and presented inventions and development milestones which have helped produce secure, highly-available wheel sensors.

Following this, Lothar Kinze, a former employee of DB Systemtechnik, reported on his experiences with axle counting systems at DB AG. Over the last 20 years, he enjoyed significant involvement in and responsibility for the introduction and optimisation of axle counting technology at DB AG. Summing up, Lothar Kinze compared the track circuit and axle counting system technologies with one another: “Overall, the advantages of axle counting technology far outweigh any disadvantages for DB. The somewhat higher investment costs pay off due to the fact that we have fewer faults and significantly lower inspection outlay.”

Erich Grünberger, ÖBB Infrastruktur AG, Control Command Signalling, showcased a new
Jan Miękiewicz, PKP Polskie Linie Kolejowe S.A., Poland

"I think it is very interesting how Frauscher is meeting new and very specific customer requirements. It became clear that customer focus is something they really put into practice."

A concept for a speed checking facility (GPE) within the ÖBB (Austrian Federal Railways) network. "The operational tests revealed that the functional and technical characteristics of the Frauscher wheel sensor RSR123 satisfy the requirements relating to speed detection for the GPE NEW. Integration in existing maintenance systems therefore guarantees simple installation and maintenance of the GPE components and reduced number of hardware components is reduced. This speed testing system using a single sensor therefore constitutes a forward-looking and very economical solution", said Erich Grünberger.

In the final lecture of the forum, Martin Rosenberger, Frauscher Sensortechnik GmbH, Sales and Product Management, introduced the latest generation of axle counting devices, the Frauscher Advanced Counter FAdC.

This system is based on an open serial communication interface and offers optimum integration into the signalling system and a reduction in the number of components. Users of the FAdC enjoy a range of advantages over conventional systems as far as functionality, required space and investment and operating costs are concerned.

Due to considerable interest, the Wheel Detection Forum will be organised once every two years in future.

Further detailed information, together with podcasts and downloads of the presentations, can be found at: www.wheeldetectionforum.com
Now that the northern section of the Ghan has opened up between Alice Springs and Darwin, the Australian railway network covers around 44,000 km. But there is just a single railway connection joining the east and west coasts. The stretch is 4000 km long and the trip takes three days, with one stretch of 500 km counted as the longest straight section of railway in the world.

In the field of wheel detection and axle counting, Frauscher Sensortechnik and its sales partner Selectrail have been the Australian market leaders for many years after starting out as one of the first companies offering these technologies down under. Managing Director Michael Thiel is pleased to report that “We currently have several projects in the pipeline in Australia which we are gradually implementing in collaboration with our local partner Selectrail.”

The market is developing rapidly in Australia and New Zealand, especially in the rail safety technology sector. Frauscher and Selectrail are not only the market leaders in terms of technology. “With Selectrail, we can also offer a widespread service network on this continent. All the training and support for system start-up are provided by Selectrail. For our customers, this is a decisive factor in choosing a partner”, explains Michael Thiel.

**SELECTRAIL – strong, reliable partner**

Selectrail is a division of Selectrix, which is a private Australian rail technology company with 150 employees in Australia, New Zealand and Indonesia. Founded in 1978, Selectrix is currently run by David Stuckey. The company has its headquarters in Melbourne but remains in constant contact with its branch offices in Sydney, Brisbane and Perth. With subsidiaries in New Zealand and Indonesia, Selectrix can provide comprehensive support for the Pacific region.

The SELECTRAIL division of Selectrix is the official sales partner for Frauscher wheel detection and axle counting systems in Australia and New Zealand.

Michael Strike, General Manager of SELECTRAIL: “We are not only a sales partner for Frauscher Sensortechnik. With our widespread company network, we cover all service activities for Frauscher and are involved in product development for further signal technology innovations. We are already offering the latest-generation FAdC axle counters for our current projects and setting the standards in terms of innovation in the region.”
The KiwiRail Auckland electrification project is one of the biggest railway modernisation projects currently in progress in the Southern Hemisphere. Over the last eight years, passenger numbers in New Zealand have quadrupled, making a more efficient railway network in the Auckland region a necessity.

In 2009, Invensys Australia won the contract for modernising the railway system. A 25 kV/50 Hz power supply was selected for electrification. In order to increase capacity, all the signalling systems for the network (160 track kilometres) also needed to be updated.

The track vacancy detection system used was the Frauscher ACS2000 axle counting system which was supplied and commissioned by Frauscher’s exclusive partner in Australia and New Zealand SELECTRAIL Australia Pty Ltd. The KiwiRail project has been implemented in five stages. To date, more than 870 counting points have been fitted for around 690 track vacancy detection sections.

There were a range of different challenges to face before the project could be implemented. One of the major problems was ensuring that the maintenance vehicles with a wheel diameter of just 250 mm were detected by the axle counter system and correctly evaluated. The combination of the RSR180 wheel sensor, the IMC006 analysis module and the ACB119 axle counting board represents the most efficient solution in order to guarantee utmost security and availability on a sustained basis. The operator is very pleased with the way the system is running.

The project is due to be completed in early 2012, but the innovative axle counting system is already making an impression with its efficiency and significant cost savings. According to KiwiRail, the potential cost savings of operating a track vacancy detection section with the ACS2000 are roughly 40 percent compared to one using track electricity circuit technology and around 60 percent compared to those with sound frequency circuit systems.
updated CMK line in Poland

The modernisation of the Polish CMK line operated by PKP is an extraordinarily important project. Frauscher has successfully developed and established customer-specific solutions for the most important high-speed line in Central Eastern Europe based on long-standing, intensive cooperation with local signalling technology manufacturers, authorities and operators.

The CMK line (Centralna Magistrala Kolejowa) is one of the most important high-speed lines in Central Eastern Europe, covering 223 km. Trains reach top speeds of over 200 km/h. The CMK line was built between 1971 and 1977.

**Modernisation of the CMK line.**

One of the main aims of the modernisation process was to considerably improve service outlay, maintenance and resistance to external influences (e.g. temperature, EMC, atmospheric discharge). But the aim was to continue using the existing cable systems.

For this project, Frauscher offered the ACS2000, already established around the world as an axle counting system, combined with the RSR123 wheel sensor generation as an alternative to the existing track circuit technology.

At the same time, Frauscher was granted unrestricted permission to connect the Frauscher ACS2000 to the existing block system by "Urzad Transportu Kolekowego", the Polish railway authority.

Work has been ongoing on replacing the existing systems with the ACS2000 in stages since 2007. Currently, more than 275 RSR123 have already been fitted. Operational experience has shown that storms and inclement weather are no longer causing problems and availability has been improved significantly.

At the same time, the power supply structure has been significantly simplified, with individual basic settings process implemented.

**Outlook**

Approval for the Eac-95 block system in conjunction with the ACS2000 is anticipated before the end of the year. Frauscher Polska is currently working with PKP and other partner companies on new solutions relating to rail crossing safety systems, block lines, etc.

Initial tests have produced very promising results.
In order to guarantee that this top-quality support is always available quickly and with the flexibility and efficiency one would expect from Frauscher customer support, Frauscher has decided to sign up some capable partners. Given appropriate training and practical experience, they can then provide sensor technology on Frauscher’s behalf as “certified service partners”.

The main roles of the “certified Frauscher service partners” are:

- setup and commissioning of test installations;
- assembly and commissioning support;
- other support functions (e.g. software updates, etc.);
- troubleshooting and analysis.

So in spring 2010, Frauscher organised an invitation to tender which met with great interest from potential service partners. After an extensive recruitment phase, the contract went to L&B Elstal, who were able to present the most convincing concept and most economical quotation. L&B has many years of experience and huge expertise in assembly, commissioning and maintenance of railway signal technology for the functions required.

Ten L&B employees have already undergone extensive training at Frauscher before being named official employees of the “Frauscher Service Partner”. L&B made a commitment to carry out annual refresher training and continuous professional development.

Since it was certified, L&B has already taken on several service orders on behalf of Frauscher. Among others, these included commissioning the ACS2000 axle counting system, a field trial in Siegdorf (ICE line) and a software update for RSR123 in Germany (Chemnitz, Döbeln, Waldheim, etc.). More service work is planned, including some in Denmark.
Bucking the trend insourcing critical production processes

Each individual sensor from Frauscher Sensortechnik contains specialist coils. These can differ in number, size, geometry and structure depending on the sensor type. The sensors are designed by the company’s developers using complex process and transferred to series production after numerous prototypes and tests. Production was then generally outsourced to external manufacturers.

One of the critical elements in the production of high-quality inductive sensors is a perfect coil. The following are the key factors to be considered when producing sensor spools:

- use of top quality, precision components such as coil-formers, interim layers and copper flexes;
- precise winding methods;
- perfect tinning of coil connections;
- storage of coils in specific conditions, e.g. constant very low air humidity.

The coil systems in modern sensors such as the RSR123 are complex, extremely precise components which need to be subjected to intensive quality control processes again prior to fitting.

In order to ensure consistently high quality for these sensitive components, Frauscher has now decided to bring the critical production process back in-house again.

Production management has developed a strategy, appointed specialist personnel and invested in production equipment, storage systems and automated measurement equipment.

The sensor production team led by Stefan Brandstetter can already report the first positive effects of this "insourcing process". Throughput times and rejection rates have been significantly reduced and any fluctuations in coil production quality have been eliminated.

For Frauscher, it makes sense to have critical production processes completely under control and not outsource them. In-house coils ensure seamless quality control, reduced production times and flexible storage, which are all of benefit to the customer.
First FAdC order

In early 2011, Invensys Rail got the contract to modernise all the signal technology for the 55 km, two-track stretch of railway between Crewe and Shrewsbury in England. This project covered seven level crossings and two complex intersections.

This is the first project carried out using the newly developed "Modular Signalling System", i.e. based on a decentralised architecture. This involves positioning the signal technology, i.e. the object controllers for points drives, signals and axle counting systems, in external cabinets along the track. The object controllers communicate via fast Ethernet networks with the Westrace Mark II interlocking.

It was really important to select a suitable, safe axle counting system which met the requirements of the modular system.

For this project, Invensys Rail opted for the FAdC, the latest generation axle-counting system and for RSR123 wheel sensors. A total of 79 wheel sensors and 19 external cabinets were installed along the 55 km of track.

Richard Colman, Managing Director of Frauscher UK: “Clearly, one of the key factors in placing the contract was the fact that the new FAdC axle counter system perfectly meets all the requirements of the modular signalling system. Due to its functional modularity and simple scalability, combined with an Ethernet interface, the FAdC system offers Invensys Rail an extremely high level of flexibility at the same time as minimising hardware requirements. For Invensys Rail, another important criterion was that the "Free/Occupied" signals and a range of other important messages was sent directly via a secure Ethernet-based interface to its
electronic interlocking. FAdC already uses Invensys’ own protocol (WNC) for this. This customer-specific interface allows optimum integration of FAdC into modern electronic interlockings. This contract is an important step towards successfully establishing FAdC in the English market.”

Frauscher: Dates

Shows:
27–29 March 2012: Expo Ferroviaria 2012, Turin, Italy
Hall 2, Stand 130, www.expoferroviara.com
1–3 May 2012: Infrarail 2012, Birmingham, England
Hall 3, Stand L30, www.infrarail.com
18–21 September 2012: InnoTrans 2012, Berlin, Germany
www.innotrans.de

Product training courses
18-20 April 2012 (German)
25-27 April 2012 (English)
10-12 October 2012 (German)
17-19 October 2012 (English)

We will be happy to provide further information about the courses or organise an individual course date with you. Feel free to get in touch with Elke Gimplinger, T: +43 7711 2920-9284 or via email: training@frauscher.com
OVERVIEW

New building to drive future growth

Frauscher Holding has invested around EUR 4 million in a new company building, laying the foundations for further growth for the Frauscher Group and for Frauscher Sensortechnik in particular. The investment allows the company to press ahead with its global growth strategy and secure its position as the market leader in terms of technology in the long term.

On 30 September, Josef Pühringer, Governor of Upper Austria, attended the opening of the new company headquarters and praised the innovative approaches Josef Frauscher was taking in ensuring an international direction for his company. During the opening ceremony, he awarded the company founder with the Golden Merit Award from the Region of Upper Austria. The award was largely in honour of Josef Frauscher’s active company location policy and the creation of modern jobs.