

THALES

COUNTINGWORLD

The Customer Magazine for Axle Counter Systems

09.2014

www.thalesgroup.com/germany



Service Passion in UK

Flood, Storm and Axle Counters



New market for Thales Axle Counters

Kick-start in Bangladesh!



myProducts – Anytime, Everywhere

Always in my pocket



Dear Reader,

High Availability and Low Cost – A Conflict?

It's a common belief that a high availability system is always associated with large financial investments into systems and technology. Is it really true?

Only to a certain extent. The fully redundant Axle Counter Systems in the tunnel projects in Switzerland (Loetschberg and Gottard) or the High Speed Line in the Netherlands do of course come at a larger price tag.

Nevertheless, considering the huge financial impact of a single service affecting failure, the additional cost for such a fully redundant and 100% available system is well invested. But as always, the issue is not black and white. The key to an appropriate investment is:

The right balance between modularity and functionality.

It is the modularity to support different application scenarios and the functionality to provide the flexibility to support different redundancy schemes that achieves this balance.

Thales has invested heavily in this field and has developed a number of very innovative approaches, especially for Axle Counters:

Redundancy for Axle Counter Detection Points for particular vulnerable areas of the network like key points or crossings, or *Automatic Reset through Meta-Sections* avoiding an operational impact during temporary site disturbances.

Most of those initiatives are either incorporated into the basic Thales system design or come with a marginal increase of material, but at a **Higher ratio of Benefit versus Cost**.

We believe it is our duty as a trusted signalling supplier to anticipate the technological advances and implement the necessary products and functionalities to provide the appropriate availability at a competitive price line.

Read the latest technology updates as a member of the exclusive Counting World of Thales.

Serge Bertrand
Vice President Main Line Signalling Transportation Systems
Thales Ground Transportations Systems

Thales Germany's new headquarters in Ditzingen

After a building program lasting two years Thales Germany's new headquarters in Ditzingen has finally consolidated

the previous facilities in Stuttgart-Zuffenhausen, Korntal, and Pforzheim under one umbrella in June 2014. The entire

constructing project has been awarded the 'LEED-GOLD' certification for environmental protection and sustainability. About 1,800 colleagues are currently working on site in the different business areas of Ground Transportation Systems, Air Traffic Management and Defence & Security.

Highly regarded technology companies are now located in the immediate vicinity of Thales, underscoring the Group's clear commitment to Germany and its expertise as a high-technology and engineering business base.

Continuing our long history in Baden-Wuerttemberg, Thales Deutschland maintains its long-standing ties to the region and its people.





Success Story

Thales Axle Counter System in Bangladesh in cooperation with LSIS

In late 2012, Thales was awarded a contract by LSIS, a leading Korean signaling supplier, to supply the Thales Axle Counter System Az LM for a signaling project in Bangladesh. Thales technology has been selected as it provides the most favourable benefit in terms of modularity, performance and price. The decades of Thales experience in India has contributed significantly to the successful cooperation between LSIS and Thales. The project comprises three track arrangements:

1. **13 Stations**
(Joydevpur to Mymensingh) equipped with 168 Detection Points
2. **Tongi Project**
(Tongi to Bhairab Bazar) equipped with 44 Detection Points
3. **Laksam Project**
(Laksam to Chinki) equipped with 42 Detection Points

What makes the Thales system a success?

Thales is not only a material supplier, but a full service provider. With the flexibility of the Axle Counter system structure, Thales can enable a customer to be in a position to install, engineer and finally operate and maintain the Axle Counter System in all respects independently by transferring support and Know-how into the country.

The project in detail

Thales was responsible for the Hardware delivery and project specific hardware adaptations. A Factory Acceptance Test (FAT) was performed at Thales production plant in Arnstadt before each delivery batch, where Thales welcomed an independent technical inspection agency appointed by the customer. Thales supported LSIS for the onsite installation and commissioning works, such as the drilling of rail.



Drilling of the hole

To ensure the correct usage of the equipment by the customer, Thales created an extensive training package. At first, a technical workshop was conducted by Thales in Korea which was attended by LSIS and Bangladesh Railways engineers. Subsequently a class room training was provided by Thales University in Bangladesh. This included Engineering, Data Preparation and Verification, Installation, Test and Commissioning followed by hands-on on-site support.



Training course in Bangladesh

Bangladesh is another country using Thales Axle Counters successfully in a sub-tropical monsoon climate. All in all the customers are very satisfied and looking forward to extend the railway business with Thales.

LSIS

LS Industrial Systems Co. Ltd, having its headquarter in Gyeonggi-do, South Korea was founded back in the year 1974. LSIS focus on Power, Automation & Green Business and is the leader and most experienced provider in Korea's railway industry.

With production facilities speaded over China, South Korea, and Vietnam with subsidiaries and branches speaded across the globe, LSIS employs more than 3200 people. In 2012 LSIS partnered with Thales, as the preferred Axle Counter supplier for their global railway signaling projects.

Thales Redundant Detection Point Solution

The easiest way to introduce redundancy into your existing installations

The reliable detection of trains is fundamental to the safe operation of modern railways. This makes the availability of the system components of vital importance to the whole system.

At the same time the finite MTBF values of the individual system components limits the reliability and - by this - the availability of the system. The only way to conquer this limitation is with redundancy. In other modes of transportation with high safety requirements, such as air transportation, it is taken for granted that key components which are essential for safety have multiple redundancy.

railways is well protected against any sort of impact from outside, the outdoor conditions are much more complicated to control. Failures of Detection Points or the supporting infrastructure like cabling are not completely avoidable. To enhance the availability of a train detection system, Thales has developed the Redundant Detection Point Solution.

This solution supports the use of Redundant Detection Points without modifications of the interface to the interlocking. The information of both Detection Points is evaluated and synchronized by the Axle Counter Evaluator. In case of any inconsis-

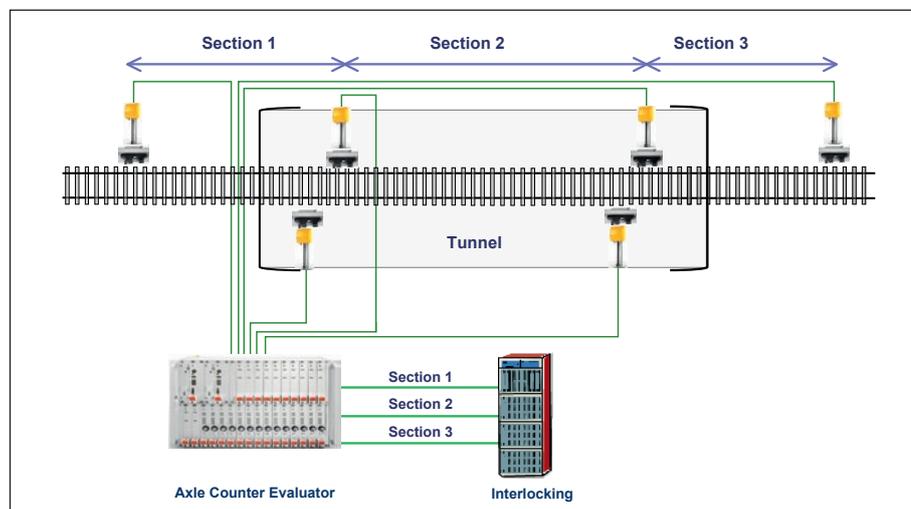
Typical applications of the Redundant Detection Point Solution are:

- Lines with high train density
- Difficult maintenance access to site
- Areas with high impact on railway operation
- High Speed Lines
- Tunnels

As a result of the redundancy, the operation of the railways remains uninterrupted while the maintainer can analyze the problem remotely and fix it at convenient time.

The safety of the Train Detection System is optimized to its best values:

- Ability to add redundancy to existing installation without modification in the interlocking's interface
- Possibility to combine Redundant and Non-Redundant Detection Point in the same Axle Counter System
- Achieving a high level of availability in areas with high impact on railway operation with a cost efficient solution



Redundant Detection Points in a Tunnel Application

With AzLM the analysis of root causes for section failures shows that the vast majority of failures are caused by the outdoor equipment. While the indoor equipment at

the end of the counting information or a failure, the system marks the respective Detection Point as faulty and uses the information of the Redundant Detection Point instead.

Thanks to Thales Redundant Detection Point Solution, railways operators can minimize or eliminate the financial compensation for non-availability of train detection.



Thales Redundant Solution at HSL Zuid, Netherlands



Dawlish, Devon: Powerful storm waves pound the UK south coast

Success Story

Service is our passion

Thales has a strong presence in over 55 countries worldwide. It is through this presence that our customers are always served closely, on-site and in their own language. Our services range from engineering, installation and maintenance through to training and development. Thales UK offers a 24/7 service via our fully stocked warehouses and on call experts. This enables our customers to keep their systems operational, anywhere, anytime.

Below are two examples that demonstrate our dedication and passion to serve one of our biggest customers, Network Rail.

1st example: In February 2014 areas of the United Kingdom were hit by severe flooding. The banks of the river Thames burst and flooded the Great Western Main Line. Under 6 inches of water, all of the track circuits between Twyford and Maidenhead stations were rendered completely useless. This rail route is responsible for transporting thousands of people to London and back each day, without it major UK business would struggle. Network Rail implemented emergency procedures to manually control the trains, but this could only reach a maximum of 35% capacity.

In a superb example of customer-supplier collaboration, Thales engineered and supplied an AzLM Axle Counter System within 24 hours.

This enabled the installation and commissioning of an overlay system, almost instantly

returning the line to 100% capacity. Mike Sowden, Route Business Change Director at Network Rail commented: "Many thanks to Thales for the swift response to our issues in Maidenhead. Without doubt, the assistance with producing the design and the supply of the critical axle counter material is excellence in service. To give you an idea of the profile of the issue, the Prime Minister was briefed on progress of the works every day. Mark Carne, Chief Executive of Network Rail was on-site and the Home Secretary was commending everyone for the efforts made. Please pass my thanks onto your team."

2nd example: In February 2014 the United Kingdom was hit by severe overnight storms. Coastal towns reported waves up to 6 metres in height. Almost 9000 homes across South West England were left without power. Railway operator First Great Western was forced to close lines due to the adverse weather conditions. In Dawlish, Devon, a section under the railway collapsed, leaving the track suspended in mid air. The line was forced to close on February the 4th cutting off all rail services to the area. Existing signaling equipment, including AzL 70-30, which served faultlessly for decades, was washed into the sea. Engineers were on site instantly and despite adverse weather conditions repair works began within days. A temporary sea wall was constructed to enable repairs but this was overcome after only two weeks. Despite the weather and facing an almost impossible task, the engineers were eventually able to rebuild the original sea wall.

In addition to the works at the breach site the engineers repaired dozens of sites, cleared hundreds of tons of debris and restored the signaling system. In parallel to the ongoing civil works, Thales engineered the replacement of the washed out Axle Counter System, upgrading it to the slimline Zp30K with AzLM Evaluators, allowing a return to full operation. The system was delivered, commissioned and connected to the signaling system without issue. On April 4th the railway at Dawlish line reopened. Mike Sowden, Route Business Change Director at Network Rail commented: "Thales did an extraordinary job supporting Network Rail's engineers in their battle to overcome every obstacle thrown at them by Mother Nature in Dawlish. The excellent team working was key for the recovery of the signaling system in Dawlish. Many thanks for the outstanding service."



Network Rail is the owner and operator of most of the rail infrastructure in the United Kingdom: England, Scotland and Wales. Network Rail owns the infrastructure, including the railway tracks, signals, overhead wires, tunnels, bridges, level crossings and most stations. Network Rail covers 20,000 miles of track. Thales Axle Counter System Az LM was introduced by Network Rail in 2002. Since then more than 8,000 of Thales' rail contacts have been put into service on the tracks of Network Rail.

Centralized Diagnostic System

Powered by Thales Az LM Remote Diagnostics Software (ARD)

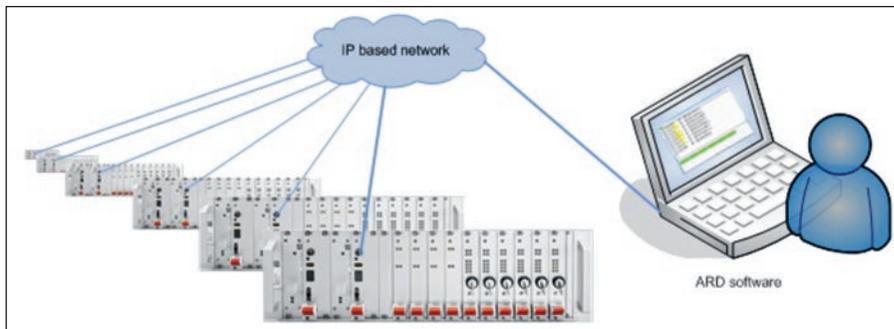
With information systems becoming continuously cheaper and more reliable, condition-based maintenance is becoming an important tool for operating a railway

drill down and diagnose every of the connected Az LM Axle Counter using the proven functions of GDI without switching over to another workplace.

The ARD Software provides all real time data in a plain data format ready for analysis with standard office software. The usage of standard office software for the data analysis enables the concerned staff to freely choose the indicators and thresholds for condition-based maintenance. The maintenance staff can improve their analysis with the evaluation of history from the installed base, in-line with the life-cycle of the equipment.

Below an example of the usage of the diagnostic of the Detection Points in order to determine the decision to readjust it. Readjustment can be caused by track maintenance or by the wear of the rail where the rail contact is mounted. The indicator used in order to determine the need of readjustment is the number of 'drift warning' messages. The graphical analysis shows which Detection Point should be a nominated for on-site inspection.

Through the use of standard office software for the data evaluation there is virtually no limitation on the choice of the indicators, for condition-based maintenance, the graphical representation of decision analysis and the presentation of results of the maintenance actions.



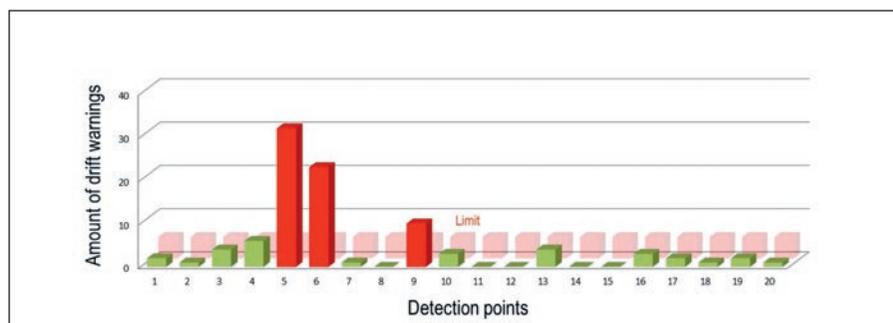
Centralized Diagnostic System

network. The concept of condition-based monitoring is key to mission critical systems achieving their availability and cost targets. Condition-based maintenance enables the support staff to make the correct diagnosis, minimizing spare parts, costs and system downtime. The maintenance personnel of today are more than ever able to decide the optimal time to perform maintenance, with the right data to support their decision.

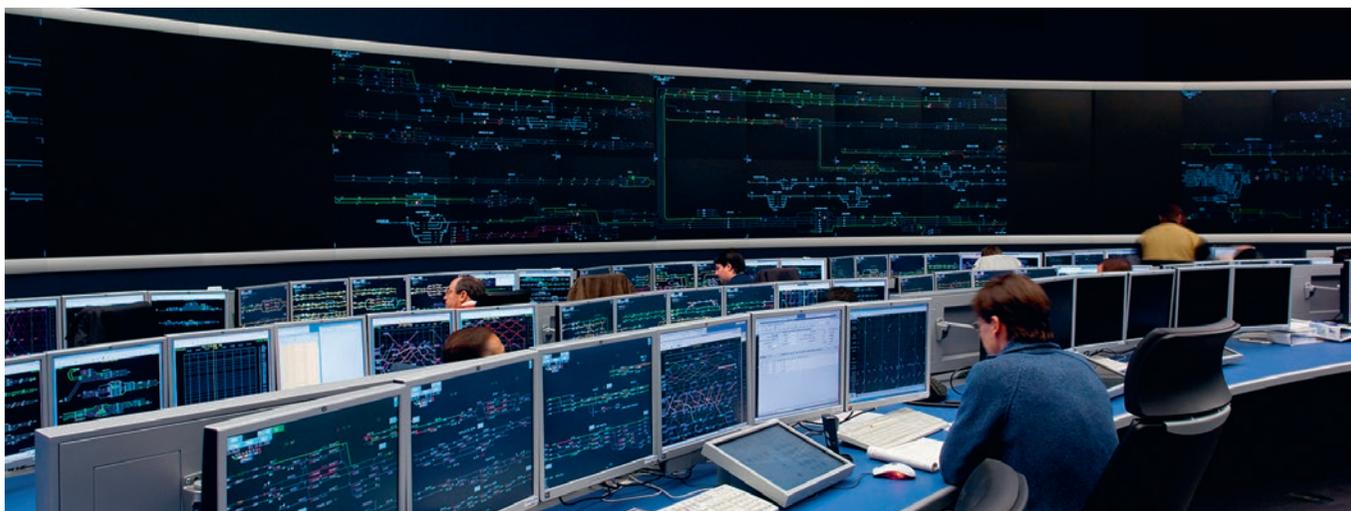
Thales Axle Counter System Az LM provides all real time data required to support condition based maintenance enabling prioritized and optimized maintenance actions. Only one computer equipped with Thales' ARD Software is required to access all diagnostic data of the supervised Axle Counter Systems at one place. Distributed systems can be connected to the Centralized Diagnostics over any IP network.

The ARD Software is an evolution of Thales' well known Graphical Diagnostic Interface System (GDI). By this the user is able to

- *Real time supervision of all the connected Axle Counter Systems in parallel*
- *Drill down to a remote detailed analysis on each connected system with all functions of the Graphical Diagnostic Interface*
- *Storage of the real time data over any period; only limited by storage capacity*
- *All actions of the maintenance staff and operators are traceable and recordable*
- *Multi language and customizable*



Analysis of real time data for condition based maintenance



Operator places in an Operational Control Center (OCC)

myPRODUCTS – Anytime, Everywhere

The promise made during the last edition of Counting World to launch myProducts by the end of 2013 has been kept. myProducts was developed to improve the overall customer experience by providing an additional service delivery channel in order to enhance the digital experience.

products. Since its inception in November 2013, myProducts has been so far successfully piloted with Network Rail in the United Kingdom. On the similar patterns, a final plan has been laid out to begin the pilot phase with the Finnish Transport Agency.



Multi-Channel Access to basic and value added content

It offers easy access 24/7 across multiple channels (Smartphone, Tablet, PC) to value added content and interactive applications supporting the maintenance of products. Furthermore, it provides a wide portfolio of basic and customer-centred E-Services - from education in the office to application in the field.

Potential features planned

myProducts is constantly being evolved and a lot more features will be added, e.g. Online Service Requests, Forums, Wikis.

Recognizing and addressing our customers' needs is the main driver for our activities around myProducts. So talk to us - and stay tuned!

Target Group

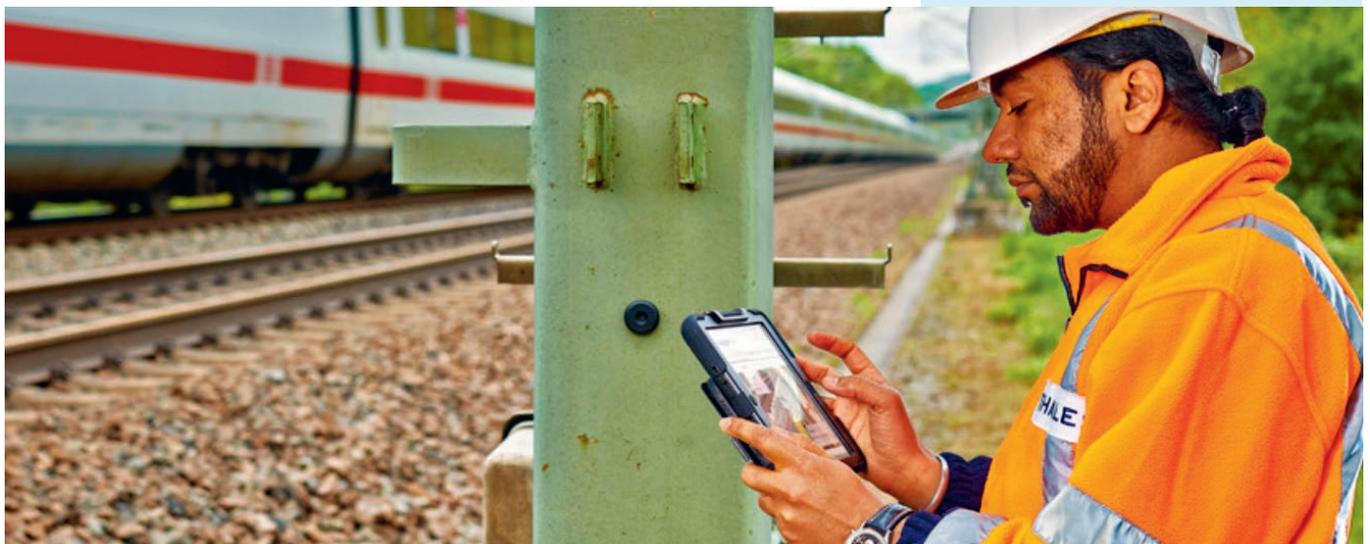
myProducts is targeted in the first stage at railway operators worldwide offering efficient support and E-services during the whole life-cycle of their operational

myProducts – your trusted companion!

Interested? Please drop a mail to: myProducts@thalesgroup.com

Key Functionalities

- A step-by-step decision-based troubleshooting guide, ensuring efficient problem diagnostics and solving (Maintenance Wizard)
- A comprehensive guidebook with attractive contents such as videos, additional maintenance notes for qualitative problem solving (How To Guide)
- Documentation and proven expert information, accessible anytime and everywhere (Document Download)
- Calendar and list view of offered training courses, registration and reminder of expired certificates (Training Reservation)
- Graphical Line Views (documents & configuration files)
- An offline-App ensuring on-site support by technicians in remote areas or tunnels
- An option to share the expertise generated during problem solving, helps in continuous optimization of the platform



Maintainer getting assistance in the field with myProducts

Redundance Axle Counter Evaluator Application for MTM

Metro Trains Melbourne selects Thales Axle Counters

MTM awarded Thales with the delivery, training and engineering support for the deployment of the AzLM Version 6.3 Axle Counter to support significant re-signalling project in Melbourne. The contract award is the result of more than 18 months close cooperation between MTM and Thales. The story began middle of 2012 when Thales

The key technical point for MTM to select Thales were

- **Rail contact mounting over the sleeper**
Installation of the rail contact over the sleeper will ease maintenance activities as the rail contacts do not need to be dismantled from the rail during tamping and grinding activities.



Trial site with 2 technics in parallel

was approached by MTM about general information for the Axle Counter product. At this time, Thales had just received the Type Approval Certificate from Aurizon in Queensland. As the interest grew rapidly, a workshop was set-up at Thales premises in Melbourne with live equipment demonstration with rail contacts mounted to real rails. Many attendees tried to provoke an influence by placing a coin or their personal key rings on the rail but could not manage to disturb the system unlike issues they have faced with similar gear before.

MTM and Thales kept in touch constantly, which culminated in a type approval by cross acceptance of the AzLM Axle Counter after a successful trial on site. During the trial period there were no disturbance on the system. Trial results derived from remote diagnostic systems demonstrated that at least 140 trains that run through the section reliably everyday.

- **Redundancy**
Additional flexibility and availability by using redundant indoor and lineside equipments
- **Ethernet connection of detection points**
The use of IP networks to connect detection points allows for a centralised architecture that is independent of distance from the field equipment. MTM is also leveraging their existing fibre optic networks to provide the backhaul connectivity.
- **Remote Maintenance**
The use of remote maintenance allows the MTM fault centre to monitor the performance of the Axle Counter System and respond proactively failure scenarios to ensure any failure has minimal impact to rail services.
- **Wheel detect rail contacts**
The robust and less sensitive rail contacts provide better vandal proof solution without impacting on integrity of the detection system.

About MTM



MTM is a joint venture company – consisting of MTR, United Group Rail & John Holland Rail

*Patronage growth
(7.9 % year on year since 2004,
forecast to continue)*

*In the busiest hour MTM runs
21 trains through the centre of
the city of Melbourne*

*MTM have a fleet size of
197 x 6 car trains*

MTM's network consists of

- 850 km of trackside infrastructure
- An underground rail loop of 20 km
- 220 Stations
- 174 Level Crossings



Train approaching Axle Counter trial in Melbourne